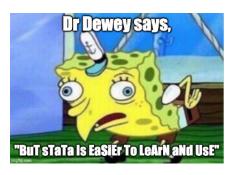
Problem Set 2

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CAP 4763 Time Series Modelling and Forecasting

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I joke but I really shouldn't. I'm spending so much time worrying about how to do things in STATA and trying to understand how it works and make it do what I want that I have no clue what's going on in this class. I have become so frustrated with STATA to the point of crying at least once for each Problem Set and several times in between.

I have no doubt that no matter how hard I try, I will fail the midterm.

Part A

- 1. Writethemodel $y_t = \alpha + \delta t + \rho y_{t-1} + \beta x_{t-1} + r$ in first differences.
- $\Delta y_t = \delta + \rho \Delta y_{t-1} + \beta \Delta x_{t-1} + \Delta r_t$
- 2. Suppose after first differencing a model is $\Delta y_t = \delta \varphi 2\varphi t + \rho \Delta y_{t-1} + \beta \Delta x_{t-1} + \Delta r_t$. What was it before the first difference was taken? (Hint: both t and t^2 are in it.)
- $y_t = \delta t + \varphi t^2 + \varphi t \varphi + \rho y_{t-1} + \beta x_{t-1} + r_t$
- 3. Suppose you are originally interested in the model $y_t = \alpha + \delta t + \rho y_{t-1} + \beta x_{t-1} + r_t$, where $r_t = \gamma r_{t-1} + \varepsilon_t$ and ε_t is an independent random disturbance. Write the dynamically complete model in first differences. Hint: first substitute to make the model dynamically complete, and then take the first difference.
- $y_t = \alpha + \delta t + \rho y_{t-1} + \beta x_{t-1} + \gamma r_{t-1} + \varepsilon_t$
- $\Delta y_t = \delta + \rho \Delta y_{t-1} + \beta \Delta x_{t-1} + \gamma \Delta r_{t-1} + \Delta \varepsilon_t$

Part B

3. Autocorrelation and Weak Dependence

1. Obtain the correlation of each variable with its one period lag.

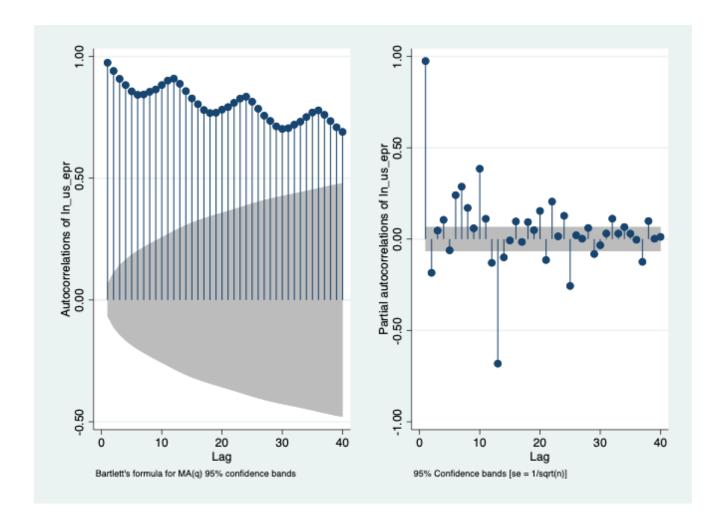
(obs=875)	corr ln_us_epr l1.ln_us_epr
	L.
	ln_us~ <i>r ln_us</i> ~r
In_us_epr	
	1.0000
L1.	0.9758 1.0000

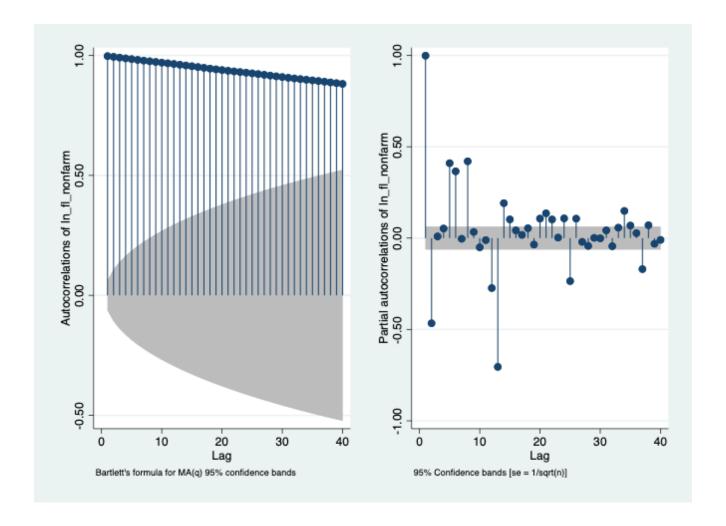
(obs=983)	corr ln_fl_nonfarm l1.ln_fl_nonfarm
	L.
	ln_fl~ <i>m ln_fl</i> ~m
In_fl_nonf~m	
	1.0000
L1.	0.9999 1.0000

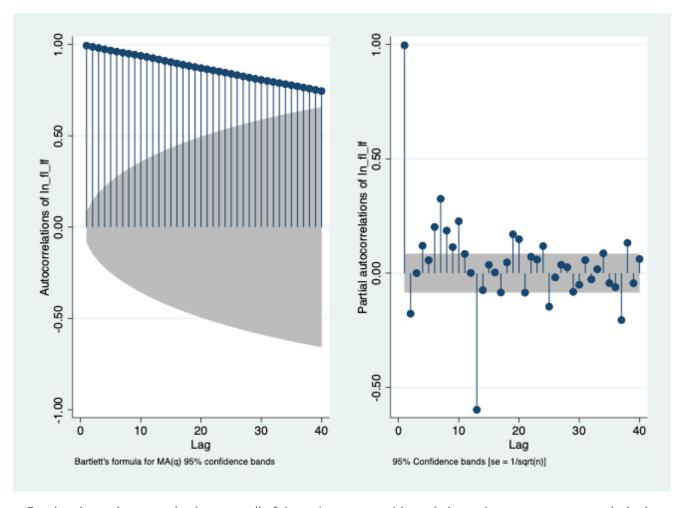
(obs=539)	corr ln_fl_lf l1.ln_fl_lf
	L.
	ln_fl_lf ln_fl_lf
ln_fl_lf	
	1.0000
L1.	0.9997 1.0000

(obs=395)	corr ln_fl_bp l1.ln_fl_bp
	L.
	ln_fl_bp ln_fl_bp
ln_fl_bp	
	1.0000
L1.	0.9470 1.0000

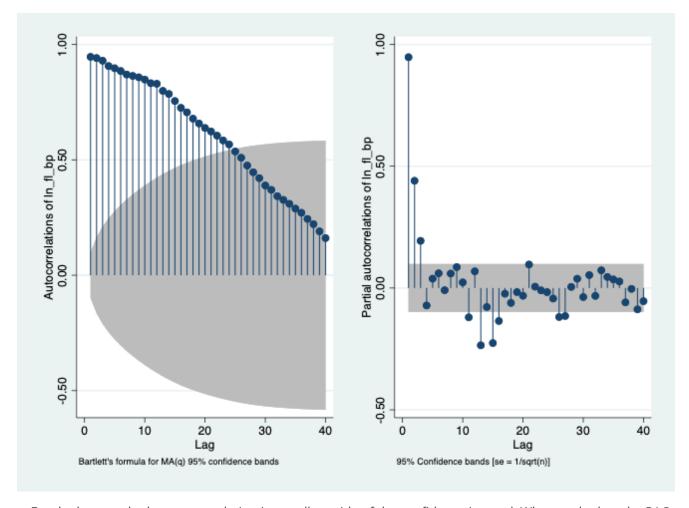
- There appears to be very high correlation between the log form of each variable and its first lag. The highest is ln_fl_nonfarm with a correlation of .9999, followed by ln_fl_lf, ln_us_epr, and ln_fl_bp with .9997, .9758, and .9470 respectively.
- 2. Obtain the autocorrelogram and partial autocorrelagram for each variable.







For the above three graphs, because all of the points are outside and above the cone, we can conclude that there is an autoregressive term in the data and should consult the partial autocorrelation graph. The PAC suggests that this is a higher order moving average.



For the last graph, the autocorrelation is not all outside of the confidence interval. When we look at the PAC we see that there are significant correlations in the first few terms followed by insignificant correlations in the rest. This suggests the order of the autoregressive term.

3. Conduct the Dickey-Fuller unit root rest for each variable.

I promise I really wanted to do nice tables here but for the life of me couldn't get stata to let me copy them properly or export them and I really didn't want to transcribe them

. dfuller ln_u	us_epr, trend	regress				
Dickey-Fuller	test for uni	t root		Numb	er of obs	= 875
	Test Statistic	1% Crit	ical	5% Cri	Dickey-Fulle tical 1 lue	r 0% Critical Value
Z(t)	-4.020	-3	.960	-	3.410	-3.120
MacKinnon appi	roximate p-vai	lue for Z(t)	= 0.008	2		
D.ln_us_epr	Coef.	Std. Err.	t	P> t	[95% Conf	. Interval]
ln_us_epr L1.	0392314	.0097585	-4.02	0.000	0583843	0200784
_trend _cons	4.02e-06 .1583652	1.84e-06 .0392952	2.18 4.03	0.030 0.000	3.99e-07 .0812411	7.63e-06 .2354894

. dfuller ln_f	l_nonfarm, tr	end regress				
Dickey-Fuller	test for unit	root		Numbe	er of obs =	983
			— Inter	polated [Dickey-Fuller	
	Test Statistic	1% Crit: Val		5% Crit Val		% Critical Value
Z(t)	-0.653	-3	.960	-8	3.410	-3.120
MacKinnon appr	oximate p-val	ue for Z(t)	= 0.9761			
D. ln_fl_nonfarm	Coef.	Std. Err.	t	P> t	[95% Conf	. Interval:
ln_fl_nonfarm	001659	.0025399	-0.65	0.514	0066433	.0033253
_trend _cons	6.93e-07 .0159216	8.56e-06 .0160282	0.08 0.99	0.935 0.321	0000161 0155318	.0000175
. dfuller ln_f	l_lf, trend r	egress				
Dickey-Fuller	test for unit	root		Numbe	er of obs =	539
			— Inter	polated [Dickey-Fuller	
	Test Statistic	1% Crit: Val		5% Crit Val	tical 105 lue	% Critical Value
Z(t)	-1.724	-3	.960	-3	3.410	-3.120
MacKinnon appr	oximate p-val	ue for Z(t)	= 0.7400)		
D.ln_fl_lf	Coef.	Std. Err.	t	P> t	[95% Conf.	Interval]
ln_fl_lf L1.	0076457	.0044337	-1.72	0.085	0163552	.0010639
_trend _cons	7.40e-06 .120517	8.61e-06 .0676628	0.86 1.78	0.391 0.075	-9.52e-06 0123997	.0000243 .2534337
. dfuller ln_f	l_bp, trend r	egress				
Dickey-Fuller	test for unit	root		Numbe	er of obs =	395
	Test Statistic	1% Crit: Val	ical	5% Crit	Dickey-Fuller tical 109 Lue	% Critical Value
Z(t)	-3.256	-3	.984	-8	3.424	-3.130
MacKinnon appr	oximate p-val	ue for Z(t)	= 0.0738	1		
D.ln_fl_bp	Coef.	Std. Err.	t	P> t	[95% Conf.	Interval]
ln_fl_bp L1.	0545463	.0167509	-3.26	0.001	0874792	0216134
_trend _cons	0000375 .5091679	.0000734 .1583766	-0.51 3.21	0.609 0.001	0001817 .1977942	.0001067 .8205417

For both Dickey-Fuller of the In_us_epr, the p-value is extremely low at .0082 and so we accept the null hypothesis. For all others, we fail to reject the null hypothesis. Especially In_fl_nonfarm and In_fl_lf.

4. ARDL Model and Breusch-Godfrey Test

Given the results of the previous question, transform the data as needed and estimate a dynamically complete ARDL model for non-farm employment. Include at least one lag of the relevant dependent variable. How many additional lags of the dependent variable, and how many lags of which independent variables you include, are up to you. Looking back at what you did for Problem Set 1 might be informative, but don't be limited by it. Produce and interpret the AC and PAC for the residuals and the results of a Breusch-Godfrey test.

In your write up, justify your specification and interpret the results.

I really wanted to try doing every other lag rather than every lag as Jake suggested but I couldn't find a way to generate a sequence of every other number in a set range. I tried doing

```
1 | gen seq3 = 2*mod(_n-1,48)
```

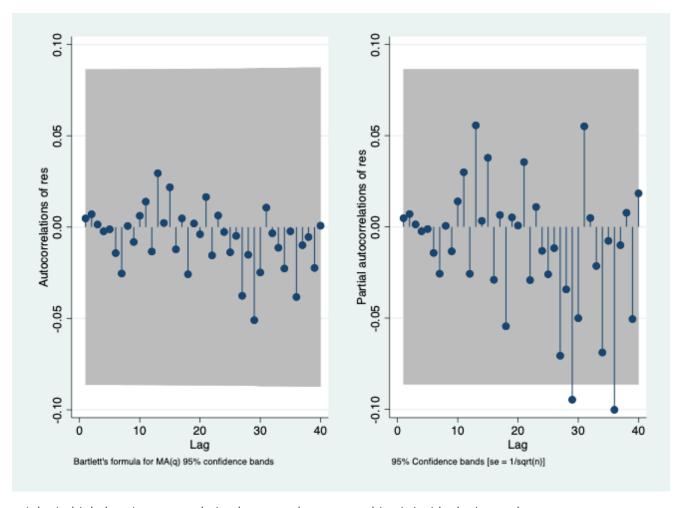
but couldn't check if it was right because the data viewer isn't showing anything then when I tried to use it I got an error that it wasn't a valid list of numbers.

	regress d.ln_fl_nonfarm l(1/48)d.ln_fl_nonfarm	l(12/24)d.ln_us_epr	l(1/18, 24)d.ln_fl_lf	date
	Source SS df MS	Number of obs =	515	
	F(81, 433) =	15.48		
Model .050091055 81 .000618408	Prob > F =	0.0000		
Residual .01729335 433 .000039938	R-squared =	0.7434		
	Adj R-squared =	0.6954		
Total .067384405 514 .000131098	Root MSE =	.00632		
D.				
ln_fl_nonfarm	Coef.	Std. Err.	t	P>t
ln_fl_nonfarm				
LD.	1441103	.059346	-2.43	0.016
L2D.	1332106	.060728	-2.19	0.02
L3D.	.0520745	.060831	0.86	0.392
L4D.	.1139409	.0609067	1.87	0.062
L5D.	.066288	.0611891	1.08	0.27
L6D.	.1944856	.0614959	3.16	0.00
L7D.	.0759452	.0622902	1.22	0.223
L8D.	.0829208	.0631492	1.31	0.190
L9D.	.2532911	.0930772	2.72	0.00
L10D.	.1403499	.0960901	1.46	0.14
L11D.	.1893271	.0946093	2.00	0.04

L12D.	.4685154	.0957577	4.89	0.000
L13D.	.0758492	.1003991	0.76	0.450
L14D.	.0089228	.1008964	0.09	0.930
L15D.	.0490602	.1006788	0.49	0.626
L16D.	0187785	.1013922	-0.19	0.853
L17D.	.0547956	.1017669	0.54	0.591
L18D.	.0863921	.1011552	0.85	0.394
L19D.	25835	.1016689	-2.54	0.011
L20D.	1621826	.1009034	-1.61	0.109
L21D.	0839614	.1033319	-0.81	0.417
L22D.	1719582	.1017154	-1.69	0.092
L23D.	.0347504	.1011416	0.34	0.731
L24D.	.2927769	.0998811	2.93	0.004
L25D.	.1178616	.098203	1.20	0.231
L26D.	.0999885	.0980021	1.02	0.308
L27D.	1283723	.0980801	-1.31	0.191
L28D.	2031139	.0980964	-2.07	0.039
L29D.	2892074	.097907	-2.95	0.003
L30D.	5772115	.0991658	-5.82	0.000
L31D.	.6236058	.1020615	6.11	0.000
L32D.	.1870999	.1073141	1.74	0.082
L33D.	.1426809	.1091241	1.31	0.192
L34D.	.1068341	.1078243	0.99	0.322
L35D.	0794067	.1078368	-0.74	0.462
L36D.	.1327386	.1064489	1.25	0.213
L37D.	0639028	.099194	-0.64	0.520
L38D.	048562	.0984536	-0.49	0.622
L39D.	.0871388	.0975069	0.89	0.372
L40D.	1442082	.0974565	-1.48	0.140
L41D.	0032331	.0966638	-0.03	0.973
L42D.	.0938246	.0970599	0.97	0.334
L43D.	3559573	.0966539	-3.68	0.000

L44D.	0089124	.0978207	-0.09	0.927
L45D.	0882528	.0966085	-0.91	0.361
L46D.	.1086727	.091884	1.18	0.238
L47D.	.0313382	.091654	0.34	0.733
L48D.	.0609195	.091323	0.67	0.505
ln_us_epr				
L12D.	0155085	.1744885	-0.09	0.929
L13D.	3056076	.153451	-1.99	0.047
L14D.	5608006	.1545155	-3.63	0.000
L15D.	3645519	.1519838	-2.40	0.017
L16D.	.0029936	.1580302	0.02	0.985
L17D.	.0422232	.1559561	0.27	0.787
L18D.	.3199335	.1565006	2.04	0.042
L19D.	07463	.0988972	-0.75	0.451
L20D.	.0625226	.0999685	0.63	0.532
L21D.	0436852	.1002131	-0.44	0.663
L22D.	.2231831	.0985078	2.27	0.024
L23D.	0081188	.0960409	-0.08	0.933
L24D.	2688582	.1616447	-1.66	0.097
ln_fl_lf				
LD.	.1762398	.0704433	2.50	0.013
L2D.	1356975	.0715783	-1.90	0.059
L3D.	1659446	.0715828	-2.32	0.021
L4D.	0977864	.0709175	-1.38	0.169
L5D.	1364495	.0722069	-1.89	0.059
L6D.	2270642	.0723796	-3.14	0.002
L7D.	1332104	.0724525	-1.84	0.067
L8D.	2396185	.0727056	-3.30	0.001
L9D.	1256755	.079465	-1.58	0.114
L10D.	180737	.0797732	-2.27	0.024

L11D.	005726	.0808095	-0.07	0.944
L12D.	.0558537	.1334055	0.42	0.676
L13D.	.0173463	.1262683	0.14	0.891
L14D.	.2969825	.1275491	2.33	0.020
L15D.	.125207	.1266497	0.99	0.323
L16D.	0665773	.1288379	-0.52	0.606
L17D.	1292395	.1273895	-1.01	0.311
L18D.	2883037	.1278108	-2.26	0.025
L24D.	.2278015	.1255369	1.81	0.070
date	-8.65e-06	3.19e-06	-2.72	0.007
_cons	.0058495	.0022338	2.62	0.009



I don't think there's any correlation because almost everything is inside the interval.

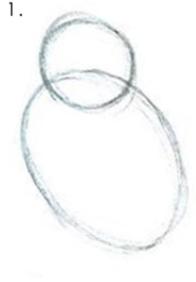
. estat bgodfrey, lag(1/48)	
Breusch-Godfrey LM test for	autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.617	1	0.4321
2	1.630	2	0.4427
3	1.639	3	0.6506
4	1.665	4	0.7970
5	1.730	5	0.8850
6	2.757	6	0.8387
7	8.252	7	0.3109
8	8.536	8	0.3830
9	8.707	9	0.4648
10	8.803	10	0.5509
11	9.015	11	0.6205
12	10.913	12	0.5364
13	12.697	13	0.4715
14	12.775	14	0.5443
15	14.075	15	0.5198
16	15.212	16	0.5091
17	15.284	17	0.5751
18	18.315	18	0.4351
19	18.317	19	0.5014
20	19.893	20	0.4647
21	19.920	21	0.5263
22	20.203	22	0.5704

23	20.218	23	0.6287
24	20.362	24	0.6760
25	21.112	25	0.6864
26	21.381	26	0.7221
27	23.290	27	0.6693
28	24.359	28	0.6624
29	25.322	29	0.6615
30	27.716	30	0.5855
31	28.706	31	0.5846
32	28.728	32	0.6330
33	29.272	33	0.6533
34	30.894	34	0.6207
35	30.897	35	0.6666
36	33.834	36	0.5720
37	35.071	37	0.5597
38	35.519	38	0.5847
39	38.229	39	0.5049
40	38.448	40	0.5402
41	38.548	41	0.5801
42	39.001	42	0.6034
43	39.107	43	0.6408
44	39.122	44	0.6804
45	39.431	45	0.7061
46	39.812	46	0.7278
47	40.011	47	0.7550
48	40.617	48	0.7664
H0: no serial correlation			

I'm so confused. It is at this point that I'm giving up trying to interpret stuff. I've spent nearly all day on it and am just as lost as before. I understand the basic commands such as regress and gen and all that. I know how to use the other commands. I don't understand what the functions are doing or why the results mean what they are said to mean. I feel like I'm being asked to draw an owl and these are my only instructions:

How to draw an owl





1. Draw some circles

2. Draw the rest of the fucking owl

I know you've said time and time again that I don't need to know what stata's doing in the background but I don't understand the math and I can't see what stata's doing for the math. In lecture all I see is a bunch of letters set up for an equation that doesn't mean anything to me outside of super abstract concepts.

Hailey and Jake and Mohammad will do their best to help me through everything. I'm reasonably certain that I can pass with about a 2 or so if my grade calculator is correct and my estimates are too. I'm not sure if it's worth it to stay in and just accept the hit to my GPA or not. Anyways. I'm going to turn this in now. I hope you're not too disappointed.

5. Dynamically Complete Models and Newey-West Standard Errors

. reg d.ln_fl_nonfarm 1(0/4)d.ln_fl_bp if tin(1948m1,2020m1)

Source	ss	df	MS	Number of obs	=	380
Model Residual	.00146591 .036972226	5 374	.000293182 .000098856		= =	2.97 0.0122 0.0381 0.0253
Total	.038438136	379	.00010142	- ,	=	.00994
D. ln_fl_nonf~m	Coef.	Std. Err.	t	P> t [95% Co	onf.	Interval]
ln_fl_bp D1. LD. L2D. L3D. L4D.	0043445 0115113 .0019871 0011778 0028262	.0035864 .0040594 .0041056 .0040768 .0036121	-2.84 0.48 -0.29	0.227011396 0.005019493 0.629006083 0.773009194 0.434009928	35 58 41	.0027075 0035291 .01006 .0068385 .0042763

. newey d.ln_fl_nonfarm l(0/4)d.ln_fl_bp if tin(1948m1,2020m1), lag(4)

.0005101

.0015358

Regression with Newey-West standard errors	Number of	obs =	380
maximum lag: 4	F(5,	374) =	4.01
	Prob > F	=	0.0015

3.01 0.003

.0005328

.0025387

D. ln_fl_nonf~m	Coef.	Newey-West Std. Err.	t	P> t	[95% Conf.	Interval]
ln_fl_bp						
D1.	0043445	.003622	-1.20	0.231	0114665	.0027776
LD.	0115113	.0036606	-3.14	0.002	0187093	0043133
L2D.	.0019871	.0043475	0.46	0.648	0065616	.0105358
L3D.	0011778	.004813	-0.24	0.807	0106416	.008286
L4D.	0028262	.003664	-0.77	0.441	0100308	.0043783
_cons	.0015358	.0004154	3.70	0.000	.0007189	.0023526

if fuller high, can't reject

_cons

Appendix A

```
clear
set more off

cd "/Users/guslipkin/Documents/Spring2020/CAP 4763 ~ Time Series/Problem Sets/Problem Set 2"

*2a
*Done

*2b Load the data
import delimited "Assignment_1_Monthly.txt"

11
```

```
12
    rename lnu02300000 us epr
    rename flnan fl nonfarm
13
    rename fllfn fl lf
14
15
   rename flbppriv fl_bp
    rename date datestring
16
17
18
    *2c Turn on a log file
    log using "Problem Set 1", replace
19
20
21
    *2d Generate a monthly date variable (make its display format monthly time, %tm)
22
    gen datec=date(datestring, "YMD")
23
    gen date=mofd(datec)
24
    format date %tm
2.5
26
    *2e tsset your data
27
    tsset date
28
29
    *2f
30
    gen ln_us_epr=log(us_epr)
31
    gen ln fl nonfarm=log(fl nonfarm)
32
    gen ln_fl_lf=log(fl_lf)
33
    gen ln fl bp=log(fl bp)
34
35
    *3a
36
    corr ln_us_epr l1.ln_us_epr
37
    corr ln fl nonfarm 11.ln fl nonfarm
    corr ln_fl_lf l1.ln_fl_lf
38
39
    corr ln fl bp 11.1n fl bp
40
41
    *3b
42
    ac ln us epr, saving(ac ln us epr.gph, replace)
    pac ln us epr, saving(pac ln us epr.gph, replace)
43
44
    graph combine ac_ln_us_epr.gph pac_ln_us_epr.gph, saving(combo_ln_us_epr.gph,
    replace)
45
46
    ac ln_fl_nonfarm, saving(ac_ln_fl_nonfarm.gph, replace)
    pac ln fl nonfarm, saving(pac ln fl nonfarm.gph, replace)
47
    graph combine ac_ln_fl_nonfarm.gph pac_ln_fl_nonfarm.gph,
48
    saving(combo ln fl nonfarm.gph, replace)
49
50
    ac ln fl lf, saving(ac ln fl lf.gph, replace)
51
    pac ln_fl_lf, saving(pac_ln_fl_lf.gph, replace)
    graph combine ac_ln_fl_lf.gph pac_ln_fl_lf.gph, saving(combo_ln_fl_lf.gph, replace)
52
53
54
    ac ln fl bp, saving(ac ln fl bp.gph, replace)
    pac ln fl bp, saving(pac ln fl bp.gph, replace)
55
56
    graph combine ac ln fl bp.gph pac ln fl bp.gph, saving(combo ln fl bp.gph, replace)
57
58
    *3c
59
    dfuller ln_us_epr, trend regress
    dfuller ln_fl_nonfarm, trend regress
60
```

```
dfuller ln fl lf, trend regress
61
62
    dfuller ln fl bp, trend regress
64
65
    regress d.ln fl nonfarm 1(1/48)d.ln fl nonfarm 1(12/24)d.ln us epr 1(1/18,
    24)d.ln_fl_lf date
    predict res, residual
66
    ac res, saving(p4 ac.gph, replace)
67
    pac res, saving(p4 pac.gph, replace)
69
    graph combine p4_ac.gph p4_pac.gph, saving(p4_combo.gph, replace)
70
    estat bgodfrey, lag(1/48)
71
72
    *5
73
    reg d.ln fl nonfarm 1(0/4)d.ln fl bp if tin(1948m1,2020m1)
    newey d.ln fl nonfarm 1(0/4)d.ln fl bp if tin(1948m1,2020m1), lag(4)
75
76
    log close
```

Appendix B

```
name:
             <unnamed>
      log: /Users/guslipkin/Documents/Spring2020/CAP 4763 ~ Time Series/Problem S
> ets/Problem Set 2/Problem Set 1.smcl
log type: smcl
opened on: 26 Feb 2021, 18:08:56
. *2d Generate a monthly date variable (make its display format monthly time, %tm)
. gen datec=date(datestring, "YMD")
. gen date=mofd(datec)
. format date %tm
. *2e tsset your data
. tsset date
       time variable: date, 1939m1 to 2020m12
                delta: 1 month
. *2f
. gen ln_us_epr=log(us_epr)
(108 missing values generated)
. gen ln_fl_nonfarm=log(fl_nonfarm)
. gen ln_fl_lf=log(fl_lf)
(444 missing values generated)
. gen ln_fl_bp=log(fl_bp)
(588 missing values generated)
. *3a
. corr ln_us_epr l1.ln_us_epr
(obs=875)
               ln_us_~r ln_us_~r
  ln_us_epr
                 1.0000
                 0.9758
. corr ln_fl_nonfarm l1.ln_fl_nonfarm
(obs=983)
               ln_fl_~m ln_fl_~m
ln_fl_nonf~m
                 0.9999
                          1.0000
```

```
. corr ln_fl_lf l1.ln_fl_lf
(obs=539)
                 ln_fl_lf ln_fl_lf
    ln_fl_lf
                   1.0000
          L1.
                   0.9997
                             1.0000
. corr ln_fl_bp l1.ln_fl_bp
(obs=395)
                 ln_fl_bp_ln_fl_bp
    ln_fl_bp
                   1.0000
          L1.
                   0.9470
                             1.0000
. *3b
 ac ln_us_epr, saving(ac_ln_us_epr.gph, replace)
(file ac_ln_us_epr.gph saved)
. pac ln_us_epr, saving(pac_ln_us_epr.gph, replace)
(file pac_ln_us_epr.gph saved)
. graph combine ac_ln_us_epr.gph pac_ln_us_epr.gph, saving(combo_ln_us_epr.gph, rep
> lace)
(file combo_ln_us_epr.gph saved)
. ac ln_fl_nonfarm, saving(ac_ln_fl_nonfarm.gph, replace)
(file ac_ln_fl_nonfarm.gph saved)
 . pac ln_fl_nonfarm, saving(pac_ln_fl_nonfarm.gph, replace)
(file pac_ln_fl_nonfarm.gph saved)
. graph combine ac_ln_fl_nonfarm.gph pac_ln_fl_nonfarm.gph, saving(combo_ln_fl_nonfarm.gph, saving(combo_ln_fl_nonfarm.gph)  
> arm.gph, replace)
(file combo_ln_fl_nonfarm.gph saved)
. ac ln_fl_1f, saving(ac_ln_fl_1f.gph, replace)
(file ac_ln_fl_1f.gph saved)
 . pac ln_fl_lf, saving(pac_ln_fl_lf.gph, replace)
(file pac_ln_fl_lf.gph saved)
. graph combine ac_ln_fl_lf.gph pac_ln_fl_lf.gph, saving(combo_ln_fl_lf.gph, replac
(file combo_ln_fl_lf.gph saved)
. ac ln_f1_bp, saving(ac_ln_f1_bp.gph, replace)
(file ac_ln_f1_bp.gph saved)
. pac ln_fl_bp, saving(pac_ln_fl_bp.gph, replace)
(file pac_ln_fl_bp.gph saved)
. graph combine ac_ln_fl_bp.gph pac_ln_fl_bp.gph, saving(combo_ln_fl_bp.gph, replac
(file combo_ln_fl_bp.gph saved)
. dfuller ln_us_epr, trend regress
Dickey-Fuller test for unit root
                                                        Number of obs =
                                                                                    875
                                              - Interpolated Dickey-Fuller
                                   1% Critical
                                                       5% Critical
                                                                          10% Critical
                 Statistic
                                       Value
                                                           Value
                                                                               Value
 Z(t)
                    -4.020
                                        -3.960
                                                            -3.410
                                                                                -3.120
MacKinnon approximate p-value for Z(t) = 0.0082
 D.ln_us_epr
                      Coef.
                               Std. Err.
                                                     P>|t|
                                                                 [95% Conf. Interval]
                                                t
   ln_us_epr
                  -.0392314
                               .0097585
                                             -4.02
                                                     0.000
                                                                -.0583843
                                                                             -.0200784
                   4.02e-06
                               1.84e-06
                                                     0.030
                                                                 3.99e-07
                                                                              7.63e-06
       _trend
                                              2.18
                   .1583652
                               .0392952
                                                     0.000
                                                                 .0812411
                                                                              .2354894
```

4.03

. dfuller ln_fl_nonfarm, trend regress

_cons

	Test 1% Critical 5% Critical 10% Statistic Value Value		Test 1% Critical		1% Critical 5% Critical		5% Critical 1	
Z(t)	-0.653	-3	-3.960 -3.410		3.410	-3.120		
lacKinnon appı	roximate p-val	ue for Z(t)	= 0.9761					
D. ln_fl_nonfarm	Coef.	Std. Err.	. t	P> t	[95% Con	f. Interval]		
ln_fl_nonfarm L1.	001659	.0025399	-0.65	0.514	0066433	.0033253		
_trend _cons	6.93e-07 .0159216	8.56e-06 .0160282	0.08 0.99	0.935 0.321	0000161 0155318	.0000175 .0473751		
. dfuller ln_1	fl_lf, trend r	egress						
Dickey-Fuller	test for unit	root		Numb	er of obs :	539		
	Test Statistic	1% Crit Val	ical	5% Cri	Dickey-Fulle: tical 10 lue	r ———— 3% Critical Value		
Z(t)	-1.724	-3	3.960	-:	3.410	-3.120		
MacKinnon appı	roximate p-val	ue for Z(t)	= 0.7400					
D.ln_fl_lf	Coef.	Std. Err.	t	P> t	[95% Conf	. Interval]		
ln_fl_lf L1.	0076457	.0044337	-1.72	0.085	0163552	.0010639		
_trend _cons	7.40e-06 .120517	8.61e-06 .0676628	0.86 1.78	0.391 0.075	-9.52e-06 0123997	.0000243 .2534337		
Z(t) MacKinnon appi	-3.256		3.984		3.424	-3.130		
D.ln fl bp					[95% Conf	. Intervall		
D.ln_fl_bp ln_fl_bp L1.	Coef.	Std. Err.	t -3.26	P> t 0.001	[95% Conf	. Interval]		
D.ln_fl_bp					[95% Conf	. Interval]		
ln_fl_bp L1trend _cons *4 . regress d.lr	Coef05454630000375 .5091679	Std. Err0167509 .0000734 .1583766	-3.26 -0.51 3.21	P> t 0.001 0.609 0.001	0874792 0001817 .1977942	0216134 .0001067 .8205417		
ln_fl_bp L1trend _cons *4 . regress d.lr	Coef05454630000375 .5091679	Std. Err0167509 .0000734 .1583766	-3.26 -0.51 3.21	P> t 0.001 0.609 0.001 m 1(12/2	08747920001817 .1977942 4)d.ln_us_epi	0216134 .0001067 .8205417 r 1(1/18, 24		
ln_fl_bp L1trend _cons *4 . regress d.lr > n_fl_lf date	Coef05454630000375 .5091679	Std. Err0167509 .0000734 .1583766	-3.26 -0.51 3.21	P> t 0.001 0.609 0.001 m 1(12/20 Numble F(81) 8 Prob 8 R-sqi	0874792 0001817 .1977942 4)d.ln_us_ept er of obs : , 433) : > F	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 = 0.7434		
ln_fl_bp L1trend _cons . *4 . regress d.lr > n_fl_lf date Source Model	Coef05454630000375 .5091679	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81	-3.26 -0.51 3.21 fl_nonfar	P> t 0.001 0.609 0.001 m 1(12/2 Numb F(81 8 Prob 8 R-squ Adj	08747920001817 .1977942 4)d.ln_us_epr er of obs = , 433) = , F = uared = R-squared =	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 0.0000 0.7434 = 0.6954		
ln_fl_bp L1trend _cons . *4 . regress d.lr > n_fl_lf date Source Model Residual Total	Coef05454630000375 .5091679 n_fl_nonfarm 1 3 SS .050091055 .01729335	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433	-3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993	P> t 0.001 0.609 0.001 m 1(12/20) Numbon F(81 8 Prob 8 Prob 8 R-squ Adj	08747920001817 .1977942 4)d.ln_us_ep; er of obs : , 433) : > F : uared : R-squared : MSE :	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 = 0.7434 = 0.6954		
ln_fl_bp L1. _trend _cons . *4 . regress d.lr > n_fl_lf date	Coef. 05454630000375 .5091679 n_fl_nonfarm 1 3 SS .0550091055 .01729335 .067384405 Coef.	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err.	t -3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109	P> t 0.001 0.609 0.001 m 1(12/2 Numb F(81 8 Prob R Adj 8 Root	08747920001817 .1977942 4)d.ln_us_epr er of obs : , 433) : > F : uared : R-squared :: MSE :	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 = 0.7434 = 0.6954 = 0.6954 = 0.0632		
ln_fl_bp L1trend _cons . *4 . regress d.lr > n_fl_lf date Source Model Residual Total O. ln_fl_nonfarm LD. L2D.	Coef. 05454630000375 .5091679 n_fl_nonfarm 1 SS .050091055 .01729335 .067384405 Coef. 14411031332106	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .060728	T -3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109	P> t 0.001 0.609 0.001 m l(12/2d Numb F(81 8 Prob 8 R-sq Adj 8 Root P> t 0.016 0.029	08747920001817 .1977942 4)d.ln_us_epi er of obs = , 433) = ; 433) = iared = R-squared = MSE = [95% Cont	0216134 .0001067 .8205417 r 1(1/18, 24) = 515 = 15.48 = 0.0000 = 0.7434 = 0.6954 = 0.00632 f. Interval]02746830138524		
In_fl_bp L1trend _cons *4 regress d.lr n_fl_lf date Source Model Residual Total .n_fl_nonfarm LD. L2D. L3D.	Coef. 05454630000375 .5091679 n_fl_nonfarm 1 SS .050091055 .01729335 .067384405 Coef. 14411031332106 .0520745	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .060728 .060831	T -3.26 -0.51 3.21 MS .00061840 .00003993 .00013109	P> t 0.001 0.609 0.001 m 1(12/2 Numb F(818 Prob R-sq Adj 8 Root P> t 0.016 0.029 0.392	08747920001817 .1977942 4)d.ln_us_ept er of obs : , 433) : > F : uared : R-squared : MSE : [95% Cont	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.000 = 0.7434 = 0.6954 = 0.0632 f. Interval] 02746830138524 .1716354		
In_fl_bp L1trend _cons . *4 . regress d.lr . n_fl_lf date Source Model Residual Total	Coef. 05454630000375 .5091679 n_fl_nonfarm 1 SS .050091055 .01729335 .067384405 Coef. 14411031332106 .0520745 .1139409	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .060728 .060831	-3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109	P> t 0.001 0.609 0.001 m 1(12/2 Numb F(81 8 Prob 8 Root P> t 0.016 0.029 0.392 0.062	08747920001817 .1977942 4)d.ln_us_ep; er of obs : , 433) : > F : uared : R-squared : R-squared :260752325258906748630057687	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 = 0.7434 = 0.6954 = 0.0954013854013854 .236504		
In_fl_bp L1trend _cons . *4 . regress d.lr . n_fl_lf date . Source Model Residual Total . Ln_fl_nonfarm LD. L2D. L3D. L4D. L5D.	Coef. 05454630000375 .5091679 n_fl_nonfarm 1 SS .050091055 .01729335 .067384405 Coef. 14411031332106 .0520745 .1139409 .066288	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .060728 .000831 .0609067 .0611891	-3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109	P> t 0.001 0.609 0.001 m 1(12/2 Numbh F(81 8 Prob 8 R-sq Adj 8 Root P> t 0.016 0.029 0.392 0.062 0.279	08747920001817 .1977942 4)d.ln_us_ep: er of obs : , 433) : > F : uared : R-squared : R-squared :2607523252568906748630657667	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 = 0.7434 = 0.6954 = 0.095400632 f. Interval] 02746830138524 .1716354 .2336504 .1865526		
ln_fl_bp L1trend _cons . *4 . regress d.lr > n_fl_lf date Source Model Residual Total	Coef. 05454630000375 .5091679 D_fl_nonfarm 1 SS .050091055 .01729335 .067384405 Coef. 14411031332106 .0520745 .1139409 .066288 .1944856	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .060728 .060831 .0609067 .0611891 .0614959	T -3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109 t -2.43 -2.19 0.86 1.87 1.08 3.16	P> t 0.001 0.609 0.001 m 1(12/2d Numb F(81 8 Prob 8 R-sq Adj 8 Root P> t 0.016 0.029 0.392 0.062 0.279 0.002	08747920001817 .1977942 4)d.ln_us_ept er of obs = , 433) = pared = R-squared = MSE = [95% Cont26075232525689067486306539766 .073618	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 = 0.7434 = 0.6954 = 0.00632 f. Interval] 02746830138524 .1716354 .2336504 .1865526 .3153532		
In_fl_bp L1trend _cons . *4 . regress d.Ir > n_fl_lf date Source Model Residual Total D. Ln_fl_nonfarm LD. L2D. L3D. L4D. L5D. L6D.	Coef. 05454630000375 .5091679 n_fl_nonfarm 1 SS .050091055 .01729335 .067384405 Coef. 14411031332106 .0520745 .1139409 .066288	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .060728 .000831 .0609067 .0611891	-3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109	P> t 0.001 0.609 0.001 m 1(12/2 Numbh F(81 8 Prob 8 R-sq Adj 8 Root P> t 0.016 0.029 0.392 0.062 0.279	08747920001817 .1977942 4)d.ln_us_ep: er of obs : , 433) : > F : uared : R-squared : R-squared :2607523252568906748630657667	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 = 0.7434 = 0.6954 = 0.095400632 f. Interval] 02746830138524 .1716354 .2336504 .1865526		
ln_fl_bp L1trend _cons . *4 . regress d.lr > n_fl_lf date	Coef. 05454630000375 .5091679 D_fl_nonfarm 1 SS .050091055 .01729335 .067384405 Coef. 14411031332106 .0520745 .1139409 .066288 .1944856 .0759452 .0829208 .2532911	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .060728 .060831 .0609067 .0611891 .0614959 .0622902 .0631492 .0631492	-3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109	P> t 0.001 0.609 0.001 m 1(12/2 Numb F(81 8 Prob 8 R-sq Adj 8 Root P> t 0.016 0.029 0.392 0.062 0.279 0.002 0.223 0.190 0.007	08747920001817 .1977942 4)d.ln_us_epi er of obs = , 433) =	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 = 0.7434 = 0.6954 = 0.0632 f. Interval] 02746830138524 .1716354 .2336504 .1865526 .3153532 .198374 .207038 .4362303		
In_fl_bp L1. _trend _cons . *4 . regress d.lr > n_fl_lf date Source Model Residual Total D. Lab. Lab. L5D. L6D. L7D. L8D. L7D. L8D. L9D. L9D. L9D. L9D. L9D. L10D.	Coef. 05454630000375 .5091679 n_fl_nonfarm 1 3 SS .0550091055 .01729335 .067384405 Coef. 14411031332106 .0520745 .1139409 .066288 .1944856 .0759452 .0829208 .2532911 .1403499	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .0609067 .0611891 .0614959 .0624902 .0631492 .0930772 .0960901	-3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109 t	P> t 0.001 0.609 0.001 m 1(12/2:	08747920001817 .1977942 4)d.ln_us_eproper	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 0.0000 = 0.7434 = 0.6954 = 0.0632 f. Interval] 02746830138524 .1716354 .2336504 .1865526 .3153532 .1983741 .207038 .4362303 .329211		
ln_fl_bp	Coef. 05454630000375 .5091679 n_fl_nonfarm 1 SS .050091055 .01729335 .067384405 Coef. 14411031332106 .0520745 .1139409 .066288 .1944856 .0759452 .0829208 .2532911 .1403499 .1893271	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .060728 .060831 .0609067 .0611891 .0614959 .0622902 .0631492 .0930772 .0960901 .0946093	-3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109 . t -2.43 -2.19 0.86 1.87 1.08 3.16 6.22 1.31 2.72 1.46 2.00	P> t 0.001 0.609 0.001 m 1(12/2 Numb F(81 Prob Root P> t 0.016 0.029 0.392 0.062 0.279 0.002 0.279 0.002 0.279 0.007 0.145 0.046	08747920001817 .1977942 4)d.ln_us_ep; er of obs : , 433) : > F : uared : R-squared : R-squared :252568906748630639766 .0736180441963 .07035190485112 .0033766	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 = 0.7434 = 0.6954 = .00632 f. Interval] 02746830138524 .1716354 .2336504 .1865526 .3153532 .1983741 .207038 .4362303 .329211 .3752776		
1n_f1_bp	Coef. 05454630000375 .5091679 n_fl_nonfarm 1 SS .050091055 .01729335 .067384405 Coef. 14411031332106 .0520745 .1139409 .066288 .1944856 .0759452 .0829208 .2532911 .1403499 .1893271 .4685154	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .060728 .060831 .0609067 .0611891 .0614959 .0622902 .0631492 .0930772 .0960901 .0946093 .0945093	-3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109	P> t 0.001 0.609 0.001 m 1(12/2 Numbh F(81 8 Prob 8 R-sq Adj 8 Root P> t 0.016 0.029 0.392 0.062 0.279 0.002 0.223 0.190 0.007 0.145 0.046 0.000	08747920001817 .1977942 4)d.ln_us_ep; er of obs : , 433) : , F : uared : R-squared : R-squared :26075232525689067486306539766 .0736180468630445112 .0033766 .2803077	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 0.7434 = 0.6954 .00632 f. Interval] 02746830138524 .17163594 .1865526 .3153532 .1983741 .207038 .4362303 .329211 .3752776 .6567232		
ln_fl_bp	Coef. 05454630000375 .5091679 n_fl_nonfarm 1 SS .050091055 .01729335 .067384405 Coef. 14411031332106 .0520745 .1139409 .066288 .1944856 .0759452 .0829208 .2532911 .1403499 .1893271	Std. Err0167509 .0000734 .1583766 (1/48)d.ln_ df 81 433 514 Std. Err059346 .060728 .060831 .0609067 .0611891 .0614959 .0622902 .0631492 .0930772 .0960901 .0946093	-3.26 -0.51 3.21 fl_nonfar MS .00061840 .00003993 .00013109 . t -2.43 -2.19 0.86 1.87 1.08 3.16 6.22 1.31 2.72 1.46 2.00	P> t 0.001 0.609 0.001 m 1(12/2 Numb F(81 8 Prob 8 Adj Root P> t 0.016 0.029 0.392 0.062 0.279 0.002 0.279 0.002 0.279 0.007 0.145 0.046	08747920001817 .1977942 4)d.ln_us_ep; er of obs : , 433) : > F : uared : R-squared : R-squared :252568906748630639766 .0736180441963 .07035190485112 .0033766	0216134 .0001067 .8205417 r 1(1/18, 24 = 515 = 15.48 = 0.0000 = 0.7434 = 0.6954 = .00632 f. Interval] 02746830138524 .1716354 .2336504 .1865526 .3153532 .1983741 .207038 .4362303 .329211 .3752776		

	.0470002				140017/	
LIOD.		.1000/00	0.47	0.020		.24074
L16D.	0187785	.1013922	-0.19	0.853	2180605	.1805035
L17D.	.0547956	.1017669	0.54	0.591	1452228	.2548141
L18D.	.0863921	.1011552	0.85	0.394	1124241	.2852084
L19D.	25835	.1016689	-2.54	0.011	4581759	0585241
L20D.	1621826	.1009034	-1.61	0.109	360504	.0361389
L21D.	0839614	.1033319	-0.81	0.417	2870559	.1191331
			-1.69			
L22D.	1719582	.1017154		0.092	3718755	.0279592
L23D.	.0347504	.1011416	0.34	0.731	1640391	.2335399
L24D.	.2927769	.0998811	2.93	0.004	.0964647	.489089
L25D.	.1178616	.098203	1.20	0.231	0751523	.3108754
L26D.	.0999885	.0980021	1.02	0.308	0926304	.2926074
L27D.	1283723	.0980801	-1.31	0.191	3211445	.0644
L28D.	2031139	.0980964	-2.07	0.039	3959182	0103096
L29D.	2892074	.097907	-2.95	0.003	4816395	0967753
L30D.	5772115	.0991658	-5.82	0.000	7721176	3823054
L31D.	.6236058	.1020615	6.11	0.000	.4230083	.8242034
L32D.	.1870999	.1073141	1.74	0.082	0238215	.3980212
L33D.	.1426809	.1091241	1.31	0.192	0717978	.3571596
L34D.	.1068341	.1078243	0.99	0.322	1050899	.3187581
L35D.	0794067	.1078368	-0.74	0.462	2913554	.1325421
			1.25	0.213	0764823	.3419594
L36D.	.1327386	.1064489				
L37D.	0639028	.099194	-0.64	0.520	2588645	.1310589
L38D.	048562	.0984536	-0.49	0.622	2420684	.1449445
L39D.	.0871388	.0975069	0.89	0.372	104507	.2787845
L40D.	1442082	.0974565	-1.48	0.140	3357548	.0473384
L41D.	0032331	.0966638	-0.03	0.973	1932218	.1867555
L42D.	.0938246	.0970599	0.97	0.334	0969425	.2845917
L43D.	3559573	.0966539	-3.68	0.000	5459264	1659882
L44D.	0089124	.0978207	-0.09	0.927	2011749	.1833501
L45D.	0882528	.0966085	-0.91	0.361	2781327	.1016272
L46D.	.1086727	.091884	1.18	0.238	0719214	.2892668
L47D.	.0313382	.091654	0.34	0.733	1488038	.2114803
L48D.	.0609195	.091323	0.67	0.505	118572	.240411
ln_us_epr						
L12D.	0155085	.1744885	-0.09	0.929	3584584	.3274413
L13D.	3056076	.153451	-1.99	0.047	607209	0040062
L14D.	5608006	.1545155	-3.63	0.000	8644942	257107
L15D.	3645519	.1519838	-2.40	0.017	6632696	0658341
L16D.	.0029936	.1580302	0.02	0.985	3076081	.3135954
L17D.	.0422232	.1559561		0.787	264302	.3487483
			0.27			
L18D.	.3199335	.1565006	2.04	0.042	.0123381	.6275288
L19D.	07463	.0988972	-0.75	0.451	2690083	.1197484
L20D.	.0625226	.0999685	0.63	0.532	1339614	.2590065
L21D.	0436852	.1002131	-0.44	0.663	2406498	.1532795
L22D.	.2231831	.0985078	2.27	0.024	.0295703	.416796
L23D.	0081188	.0960409	-0.08	0.933	1968832	.1806456
L24D.	2688582	.1616447	-1.66	0.097	5865639	.0488476
22401	.2000002	.1010447	1.00	0.077	.0000007	10400470
ln 41 16						
ln_fl_lf	48					
LD.	.1762398	.0704433	2.50	0.013	.0377865	.3146932
L2D.	1356975	.0715783	-1.90	0.059	2763815	.0049866
L3D.	1659446	.0715828	-2.32	0.021	3066375	0252517
L4D.	0977864	.0709175	-1.38	0.169	2371718	.041599
L5D.	1364495	.0722069	-1.89	0.059	278369	.00547
L6D.	2270642	.0723796	-3.14	0.002	3693234	0848051
L7D.	1332104	.0724525	-1.84	0.067	2756127	.0091919
L8D.	2396185	.0727056	-3.30	0.001	3825182	0967187
L9D.	1256755	.079465	-1.58	0.114	2818605	.0305095
L10D.	180737	.0797732	-2.27	0.024	3375278	0239463
L11D.	005726	.0808095	-0.07	0.944	1645537	.1531017
	.0558537		0.42		2063492	
L12D.		.1334055		0.676		.3180565
L13D.	.0173463	.1262683	0.14	0.891	2308286	.2655213
L14D.	.2969825	.1275491	2.33	0.020	.0462901	.547675
L15D.	.125207	.1266497	0.99	0.323	1237177	.3741316
L16D.	0665773	.1288379	-0.52	0.606	3198027	.186648
L17D.	1292395	.1273895	-1.01	0.311	3796182	.1211391
L18D.	2883037	.1278108	-2.26	0.025	5395104	037097
L24D.	.2278015	.1255369	1.81	0.070	018936	.4745389
2270.	.22/0010	.1233337	1.01	0.070	.510,00	, -0007
	0.45	0.46				
date	-8.65e-06	3.19e-06	-2.72	0.007	0000149	-2.39e-06
_cons	.0058495	.0022338	2.62	0.009	.0014592	.0102399

. predict res, residual (469 missing values generated)

. ac res, saving(p4_ac.gph, replace)
(file p4_ac.gph saved)

. pac res, saving(p4_pac.gph, replace)
(file p4_pac.gph saved)

. graph combine p4_ac.gph p4_pac.gph, saving(p4_combo.gph, replace) (file p4_combo.gph saved)

. estat bgodfrey, lag(1/48)

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.617	1	0.4321
2	1.630	2	0.4427

	1 470		0 4504
3 4	1.639 1.665	3 4	0.6506 0.7970
5	1.730	5	0.8850
6	2.757	6	0.8387
7	8.252	7	0.3109
8	8.536	8	0.3830
9	8.707	9	0.4648
10	8.803	10	0.5509
11	9.015	11	0.6205
12	10.913	12	0.5364
13	12.697	13	0.4715
14	12.775	14	0.5443
15	14.075	15	0.5198
16	15.212	16	0.5091
17	15.284	17	0.5751
18	18.315	18	0.4351
19	18.317	19	0.5014
20	19.893	20	0.4647
21	19.920	21	0.5263
22	20.203	22	0.5704
23	20.218	23	0.6287
24	20.362	24	0.6760
25	21.112	25	0.6864
26	21.381	26	0.7221
27	23.290	27	0.6693
28	24.359	28	0.6624
29	25.322	29	0.6615
30	27.716	30	0.5855
31	28.706	31	0.5846
32	28.728	32	0.6330
33	29.272	33	0.6533
34	30.894	34	0.6207
35	30.897	35	0.6666
36	33.834	36	0.5720
37	35.071	37	0.5597
38	35.519	38	0.5847
39	38.229	39	0.5049
40	38.448	40	0.5402
41	38.548	41	0.5801
42	39.001	42	0.6034
43	39.107	43	0.6408
44	39.122	44 45	0.6804
45	39.431		0.7061
46 47	39.812	46 47	0.7278
47	40.011 40.617	47	0.7550 0.7664
40	40.01/	40	v./004
	HO: no cori	al aarralatian	

H0: no serial correlation

.
. *5
. reg d.ln_fl_nonfarm l(0/4)d.ln_fl_bp if tin(1948m1,2020m1)

Source	ss	df	MS	Number of obs	=	380
				- F(5, 374)	=	2.97
Model	.00146591	5	.000293182	Prob > F	=	0.0122
Residual	.036972226	374	.000098856	R-squared	=	0.0381
				 Adj R-squared 	=	0.0253
Total	.038438136	379	.00010142	Root MSE	=	.00994
D.						
					_	
ln_fl_nonf~m	Coef.	Std. Err.	t	P> t [95% C	ont.	Interval]
ln_fl_bp						
D1.	0043445	.0035864	-1.21	0.22701139	65	.0027075
LD.	0115113	.0040594	-2.84	0.00501949	35	0035291
L2D.	.0019871	.0041056	0.48	0.62900608	58	.01006
L3D.	0011778	.0040768	-0.29	0.77300919	41	.0068385
L4D.	0028262	.0036121	-0.78	0.43400992	87	.0042763
_cons	.0015358	.0005101	3.01	0.003 .00053	28	.0025387

. newey d.ln_fl_nonfarm l(0/4)d.ln_fl_bp if tin(1948m1,2020m1), lag(4)

Number of obs = 380 F(5, 374) = 4.01 Prob > F = 0.0015 Regression with Newey-West standard errors maximum lag: $\mathbf{4}$

D. ln_fl_nonf~m	Coef.	Newey-West Std. Err.	t	P> t	[95% Conf.	Intervall
				-		
ln_fl_bp						
D1.	0043445	.003622	-1.20	0.231	0114665	.0027776
LD.	0115113	.0036606	-3.14	0.002	0187093	0043133
L2D.	.0019871	.0043475	0.46	0.648	0065616	.0105358
L3D.	0011778	.004813	-0.24	0.807	0106416	.008286
L4D.	0028262	.003664	-0.77	0.441	0100308	.0043783
_cons	.0015358	.0004154	3.70	0.000	.0007189	.0023526

. log close

. log close
name: <unnamed>
log: /Users/guslipkin/Documents/Spring2020/CAP 4763 ~ Time Series/Problem S
> ets/Problem Set 2/Problem Set 1.smc1
log type: smc1
closed on: 26 Feb 2021, 18:09:11