Leeds University Business School

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Assessed Coursework Coversheet

For use with *individual* assessed work

Student ID Number:	2	0	1	5	9	6	9	1	8
Module Code:	LUBS3370								
Module Title:	Applied Econometrics								
Module Leader:	Muhammad Ali Nasir								
Declared Word Count:	2996								

Please read the following carefully and be accurate in your responses; they are all important:

	Delete as appropriate
By submitting this work I declare it is all my own work, other than where indicated by references. I have not colluded with others, re-submitted past work of my own, submitted any work done by others or by Generative AI unless indicated, or otherwise breached the University academic integrity rules. I understand that any discrepancies between this declaration and the assignment could result in an academic malpractice procedure. Read the full University of Leeds declaration of academic integrity here https://secretariat.leeds.ac.uk/wp-content/uploads/sites/109/2022/12/academic_integrity.pdf	YES
My declared word count is accurate and I have not attempted to mislead. I understand that making a fraudulent statement about word count could result in an academic malpractice procedure, and/or may impact the mark.	YES
I have applied for an extension but have not heard yet whether it is granted. I am submitting this paper in the knowledge that I may request to submit a later version, if extension granted. Markers should be aware that this may not be my final version of the assignment. (Please indicate length of extension requested too, so we know when to expect updated submissions – delete two leaving the correct one visible)	NO
I am aware of the Generative AI category for this assignment (delete two, leaving the correct one visible), and have adhered to the guidance for that category.	RED

Assignments should be submitted in time but will be accepted (with late penalties) up to 14 days after deadline. Late penalties = 5 marks per 24hours late, down to a minimum of the bare pass mark (if pass standard).

Determinants of Inflation in Denmark and a Panel Data analysis of Denmark and 4 other countries.

Section I: Introduction

Inflation is defined as the sustained rise in the general price level (Blanchard, Amighini, & Giavazzi, 2021, p. 577).

Negative effects of inflation are well documented. For example, inflation induces overinvestment in the financial sector: as price instability increases, arbitrage opportunities grow (*ibid*, p. 4); this transfer of resources out of the productive sector can be "as large as a few percentage points of GDP and can even be seen at relatively low or moderate rates of inflation." (Mishkin & Posen, 1997, p. 4) Inflation also causes fiscal drag, which occurs when nominal income rises as real income and tax brackets remain frozen, decreasing disposable income in real terms; Fischer (1994, p. 14) estimates that an inflation rate of 10% could put the social cost of fiscal drag at 2-3% of GNP.

Due to these problems, governments around the world have decided to target low and stable inflation as a policy objective of their monetary authorities (Mishkin & Posen, 1997). These monetary authorities need a clear model for producing inflation forecasts (Masson, Savastano, & Sharma, 1997, p. 9) and must understand the determinants of inflation. This paper will contribute to this understanding by estimating the relationship between inflation and past inflation, money supply, exchange rates, and global energy prices. Inflation will be investigated first in Denmark, then also Norway, Sweden, Iceland and the UK.

Section II: Literature Review

Among economists, there are competing explanations for the fundamental causes of inflation. Friedman provides the well-known monetarist explanation where inflation is the result of money supply rising faster than output (Leeson & Palm, 2012, p. 3). This view is popular and the relationship between money supply growth and inflation has been examined by a number of studies.

Holod (2000) uses a VEC model to investigate the relationship between price level, exchange rate and money supply in Ukraine. Holod (2000) finds that the influence of money supply on inflation is not very strong, which he explains is due to concurrent fluctuations in the money demand.

Lim & Sek (2015) explore panel data on 28 countries by estimating inflation as an ARDL model against money supply (M4) and a number of other regressors. In high inflation countries, every 1% increase in the money supply is found to induce a 0.77% increase in inflation, in the long-run. In low-inflation countries, increased money supply does not have a significant effect in the long-run and decreases inflation in the short-run in low inflation countries.

Money growth leads to inflation by increasing aggregate demand, known as demand-pull inflation. On the other hand, cost-push inflation, which follows a reduction in aggregate supply, has also been examined in the literature. Cost-push inflation is typically caused by high factor prices (Ellahi, 2017, p. 3). Global energy prices are one example of a variable which should have such an effect on factor prices, and this view is supported by existing evidence.

Jatuporn (2024) and Liang & Long (2018) both estimated the impacts of global oil price changes on CPI and PPI using ARDL and NARDL models to analyse Thailand and China, respectively. Both studies find that ARDL models do not find evidence of long-run effects of oil price shocks on inflation, however NARDL models can capture the effects at a 1% significance level. Jatuporn (2024) finds: +1% change in oil price led to +0.147% CPI change; -1% change in oil price led to -0.115% CPI change. Liang & Long (2018) did not find significant long-run effects due to a drop in oil prices, but found a +1% change in oil price led to a +0.143% CPI change.

Finally, there is also a lot of evidence examining the effects of a currency's exchange rate on domestic prices. Movements in the exchange rate influence domestic prices through various channels, from direct effects on energy prices (discussed above) to indirect effects on import prices (Ha et al., 2019); this raises the price of inputs and thus the price of capital, reducing aggregate supply. The marginal effect of a 1% depreciation in the exchange rate on inflation is known as the exchange rate pass-through ratio (Ha et al., 2019, p. 271).

The exchange rate pass-through varies across countries and time (Ha, Kose, Ohnsorge, & Yilmazkuday, 2019, p. 284). Choudhri & Hakura (2001) estimated inflation as an ARDL model, using panel data of 71 countries. The explanatory variables were the nominal exchange rate and foreign CPI. They find that the long-run pass-through rates in Denmark, Sweden, Norway, and the UK are 0.24, 0.03, 0.13, and 0.03, respectively – Iceland did not form part of the panel. They also determine that the main reason for cross-country variation in the pass-through rate is due to the different inflationary regimes between countries.

Section III: Timeseries variables, data and models

A. *Data sources*

Data	**Source**
CPI	(IMF, 2024)
M3	(OECD, 2024)
Exchange Rate	(BIS, 2024)
Global Energy Prices	(FRED, 2024)

The literature varies between using real effective exchange rates (Deniz, Tekce, & Yilmaz, 2016) and nominal effective exchange rates (Choudhri & Hakura, 2001; Campa & Goldberg, 2005) – in this paper I will use the nominal exchange rate following from Campa &

Goldberg's (2005) model where it is the nominal rate that influences decision-makers at the microlevel.

B. Presenting and transforming the data

Table I contains the summary statistics for Denmark in the studied period (2000:1-2023:4). This includes the consumer price index (cpi) in 2015=100, money supply aggregate M3 (m), nominal effective exchange rate index (xr) in 2020=100, and the global energy price index (gep) in 2016=100.

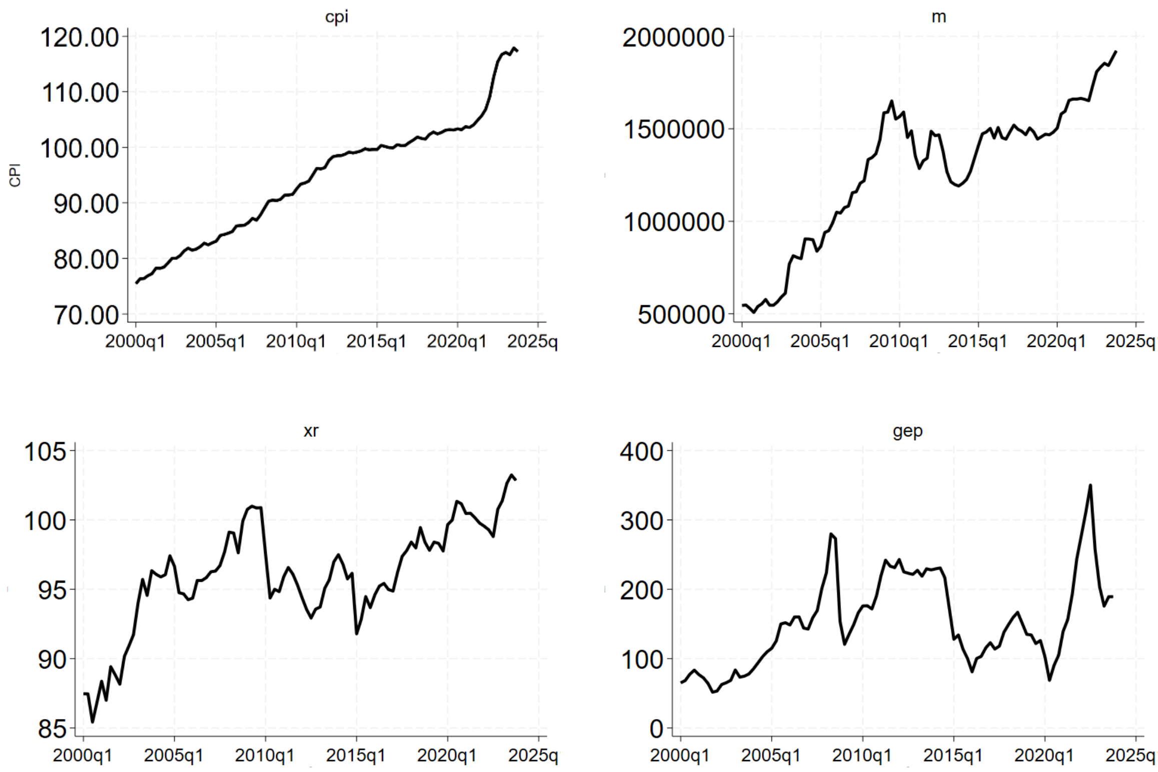
Any monthly data was converted into quarterly data by taking the value for the last month of each quarter.

Table I

Statistic	**cpi**	**m**	**xr**	**gep**
Mean	94.527	1271726.000	96.050	153.268
Median	96.967	1394929.000	96.120	148.764
S.D.	10.845	377165.800	3.815	64.919
Min	75.429	507134.000	85.430	61.703
Max	117.867	1922206.000	103.240	350.124
Obs	96	96	96	96

Figure I represents the variables visually in the studied period (2000:1-2023:4).

Figure I



To reduce data variability and find elastic relationships (Jatuporn, 2024), all variables have been transformed into logarithmic functions ($lcpi, lm, lxr, lgep$).

C. <u>Stationarity Testing</u>

The Augmented Dickey-Fuller (ADF) test will be used to test for stationarity.

Each variable is first estimated as:

$$\Delta z_t = \gamma z_{t-1} + \sum_{i=1}^{i=p} \phi_i \Delta z_{t-i} + X + e_t$$

Where:

- $Z = [lcpi, lm, lmxr, lgep]$;

- p is the number of lagged, differenced, dependent variables to include to eliminate serial correlation;
- $X = [\alpha, \lambda t]$, added if the variable is exhibiting drifting or trending behaviour;
- e_t is a stochastic error term.

The Breusch-Godfrey (BG) test is used to find how many autoregressive lags eliminate serial correlation. As all variables have non-zero means, they must have a drift/constant component. All variables – except $lgep$ – appear to be increasing over time, and thus will also be tested with trend components.

Table II shows results for $lgep$ estimated with a drift term and all other variables estimated with a trend term. BG test is included in Appendix 1 and ADF test in Appendix 2.

Table II

Variable	Lags (p)	Test statistic	5% critical value	MacKinnon p-value
$\boldsymbol{lcpi}$	5	-2.131	-3.460	0.529
$\boldsymbol{lm}$	0	-1.616	-3.455	0.786
$\boldsymbol{lxr}$	3	-3.271	-3.458	0.0712
$\boldsymbol{lgep}$*	1	-2.743	-1.662	0.0059***

*** *denotes the 1% significance level*

H_0: $Random\ walk\ with\ or\ without\ drift$

$*H_0$: $Random\ walk\ with\ drift$

We do not accept the alternate hypothesis that $lcpi, lm, lxr$ are trend-stationary. We accept the alternate hypothesis that $lgep$ is stationary with drift.

$lcpi, lm$, and lxr are then re-estimated using the ADF[1] test with a drift constant and tested for serial correlation[2], shown in Table III.

Table III

Variable	Lags (p)	Test statistic	5% critical value	MacKinnon p-value
$\boldsymbol{lcpi}$	5	-0.286	-1.663	0.388
$\boldsymbol{lm}$	0	-1.937	-1.661	0.0279**
$\boldsymbol{lxr}$	4	-2.095	-1.663	0.0196**

*** denotes the 5% significance level*

$$H_0: \ Random\ walk\ with\ drift$$

We accept the null hypothesis that $lcpi$ is a random walk with drift, and accept the alternative hypothesis that lm and lxr are drift-stationary processes due to their non-zero means.

As $lcpi$ is non-stationary, it is differenced (=$dlcpi$) and tested again for stationarity. A BG test[3] and then an ADF test[4] are applied. As $dlcpi$ has a non-zero mean, tests are conducted using a drift constant. Results are shown in Table IV.

Table IV

Variable	Lags (p)	Test statistic	5% critical value	MacKinnon p-value
$\boldsymbol{dlcpi}$	4	-4.114	-1.663	0.0000***

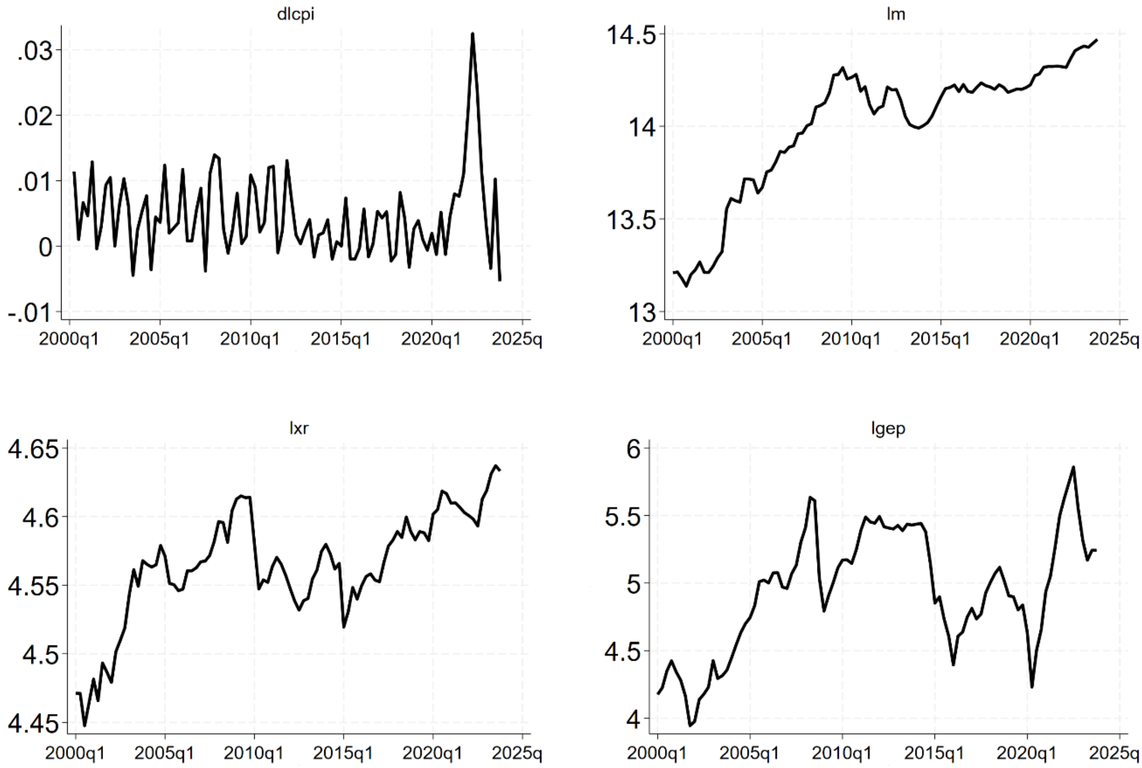
**** denotes the 1% significance level*

We accept the alternate hypothesis that $dlcpi$ is drift-stationary.

All stationary variables are displayed in Figure II.

[1] Appendix 4
[2] Appendix 3
[3] Appendix 5
[4] Appendix 6

Figure II



D. <u>*Inflation as an ARMA model*</u>

i. <u>*Estimation*</u>

$dlcpi$ will be estimated as an ARMA(p,q) model:

$$dlcpi_t = \alpha + \sum_{i=1}^{i=p} \beta_i dlcpi_{t-i} + \sum_{i=0}^{i=q} \gamma_i \epsilon_{t-i} + \epsilon_t$$

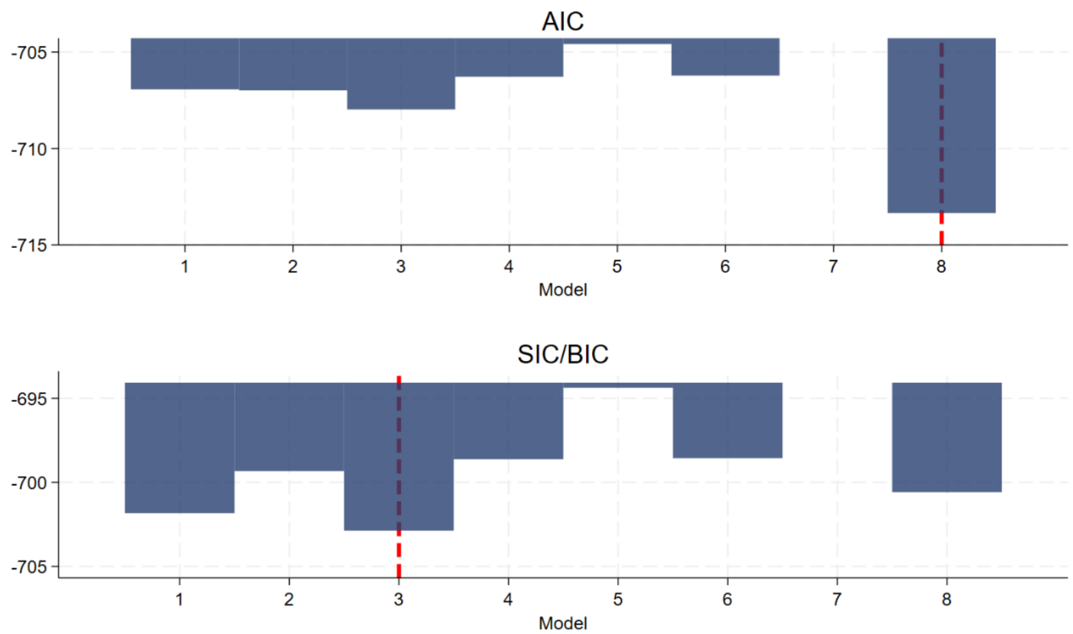
To select lags (p and q), I will be using the AIC and BIC up to a maximum of $p = q = 2$.

Table V

Model	ARMA Specification	AIC	BIC
1	(0,1)	-706.9376	-701.8299
2	(0,2)	-706.9988	-699.3292
3	(1,0)	-707.9764	**-702.8686**
4	(1,1)	-706.2838	-698.6222
5	(1,2)	-704.5892	-694.3737

6	(2,0)	-706.2211	-698.5594
7	(2,1)	-704.2863	-694.0708
8	(2,2)	**-713.3489**	-700.5795

Figure III



Shown in Figure III and Table V, AIC selects model 8, ARMA(2,2), whereas SIC/BIC selects model 3, ARMA(1,0), i.e., a pure AR(1) model.[5]

Model 3:[6]

$$dlcpi_t = \beta_1 dlcpi_{t-1} + \epsilon_t$$

Variable	Coefficient (Robust Std. Err)	p-value
$dlcpi_{t-1}$	0.380355 (0.1405789)	0.000***

*** *denotes the 1% significance level*

Model 8:[7]

$$dlcpi_t = \beta_1 dlcpi_{t-1} + \beta_2 dlcpi_{t-2} + \gamma_1 \epsilon_{t-1} + \gamma_2 \epsilon_{t-2} + \epsilon_t$$

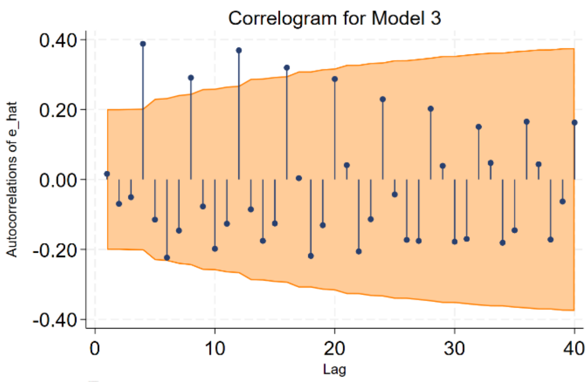
Variable	Coefficient	p-value

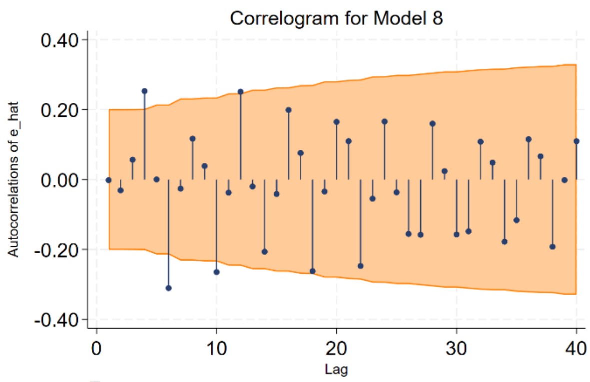
[5] Appendix 7
[6] Appendix 8
[7] Appendix 9

	(Robust Std. Err)	
$dlcpi_{t-1}$	-0.899534 (0.2194136)	0.000***
$dlcpi_{t-2}$	0.076611 (0.221312)	0.688
ϵ_{t-1}	1.427597 (0.1399993)	0.000***
ϵ_{t-2}	0.5024687 (0.1556634)	0.006***

**** denotes the 1% significance level*

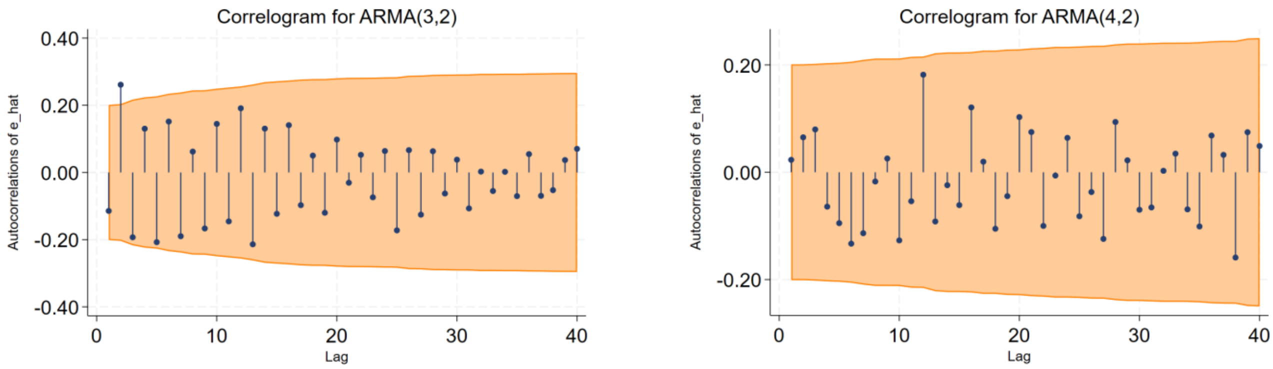
Model 8 is chosen because the extra parameters which it adds are mostly very significant and make theoretical sense and, while the extra autoregressive term is insignificant, it decreases overall autocorrelation – this can be seen when estimating the correlogram for each model:





However, model 8 suffers from serial correlation – further autoregressive terms are added to reduce this until there is no serial correlation; this process is shown in Figure IV.

Figure IV



ARMA(4,2) is preferred to eliminate serial correlation, but its coefficients are mostly insignificant,[8] whereas ARMA(3,2) contains significant results while exhibiting very small signs of autocorrelation and so is preferred. Regression results are shown in Table VI.[9]

Table VI

Variable	**Coefficient (Robust Std. Err)**	**p-value**
$dlcpi_{t-1}$	0.606 (0.125)	0.000***
$dlcpi_{t-2}$	-1.009 (0.0223)	0.000***
$dlcpi_{t-3}$	0.558 (0.131)	0.000***
ϵ_{t-1}	-0.163 (0.0830)	0.050*
ϵ_{t-2}	1.000 (1.92×10^{-6})	0.000***

** denotes the 10% significance level*

**** denotes the 1% significance level*

ii. Analysis

Regressing on $dlcpi$ finds effects on the rate of change of period-on-period inflation in Denmark, i.e., the acceleration of Danish CPI. For example, a 1pp increase in inflation from quarters $t-2$ to $t-1$ will, on average, cause a 0.606pp increase in inflation from quarters $t-1$ to t.

The autoregressive coefficients indicate that inflation in past periods has varying effects on the present period; an increase in inflation by 1pp two periods ago will decrease present inflation by 1.009pp today. However, by summing past period coefficients we know that in general, a homogenous increase in past inflation (i.e., +1pp in all past periods) will increase inflation by 0.155pp today.

[8] Appendix 18
[9] Appendix 19

The moving average coefficients indicate the impulse response due to an exogenous shock. The effects of a shock two periods ago are fully passed on to the current period; an inflation shock in the previous period is very close to conventional statistical significance and will cause an opposing change in inflation in the present period. The coefficients indicates that inflationary shocks in Denmark dissipate eventually, but slowly.

E. *Estimating inflation as an ARDL model*

i. Estimation

$dlcpi$ will be estimated as an ARDL model:

$$dlcpi_t = \alpha + \sum_{i=1}^{i=p} \beta_i dlcpi_{t-i} + \sum_{i=0}^{i=q} \gamma_i lm_{t-i} + \sum_{i=0}^{i=r} \delta_i lxr_{t-i} + \sum_{i=0}^{i=s} \kappa_i lgep_{t-i} + \epsilon_t$$

Specification selection, i.e., choosing p, q, r, s, will be done on the basis of AIC/BIC testing and prevalence of autocorrelation. All 54 possible specification combinations will be checked and the entire table of results is available in Appendix 10.

Figure V

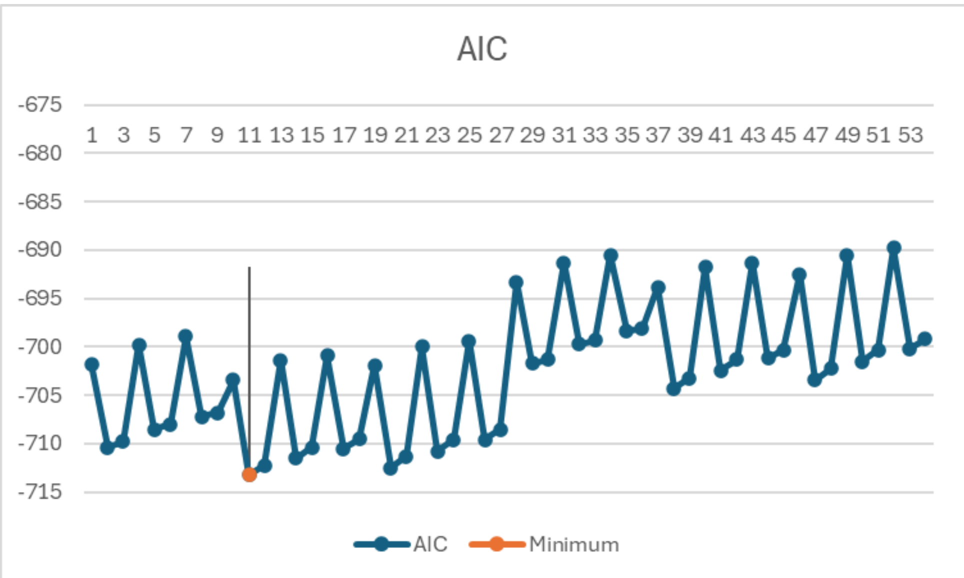
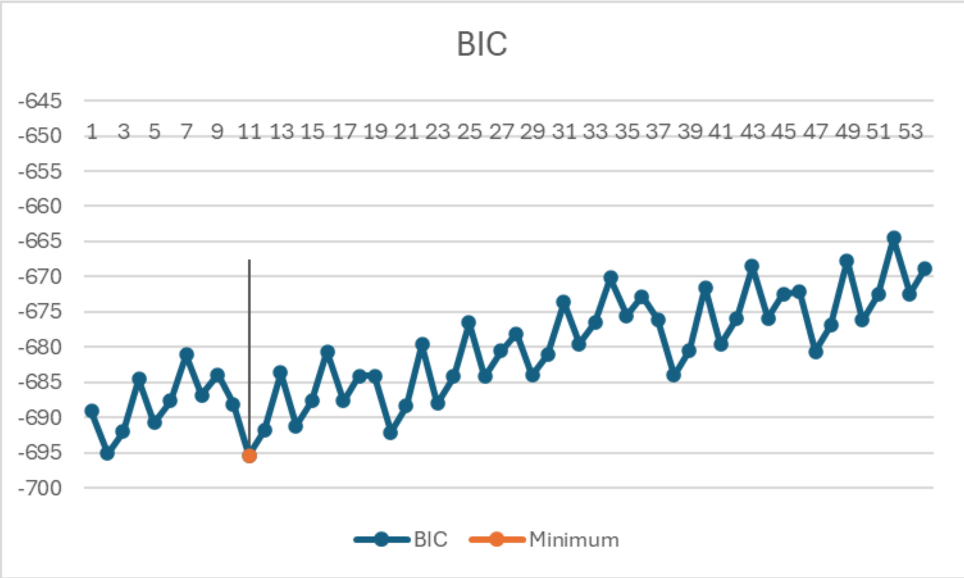


Figure VI



Model 11 is selected by both AIC and BIC, shown in Figure V and Figure VI.

This model does suffer from autocorrelation which can be eliminated by adjusting the model to ARDL(5,1,0,1).[10]

ARDL(5,1,0,1):

$$dlcpi_t = \beta_1 dlcpi_{t-1} + \gamma_1 lm_t + \gamma_2 lm_{t-1} + \delta_1 lxr_t + \kappa_1 lgep_t + \kappa_2 lgep_{t-1} + \epsilon_t$$

Table VII

Variable	Coefficient (Robust Std. Err)	p-value
$dlcpi_{t-1}$	0.394 (0.139)	0.006***
$dlcpi_{t-2}$	-0.00215 (0.0895)	0.981
$dlcpi_{t-3}$	0.00469 (0.0983)	0.962
$dlcpi_{t-4}$	0.473 (0.104)	0.000***
$dlcpi_{t-5}$	-0.401 (0.137)	0.004***
lm_t	0.0160 (0.0104)	0.129
lm_{t-1}	-0.0159	0.127

[10] Appendix 17

	(0.0103)	
lxr_t	-0.0164 (0.0155)	0.294
$lgep_t$	0.0197 (0.00311)	0.000***
$lgep_{t-1}$	-0.0171 (0.00304)	0.000***

*** denotes the 5% significance level*

**** denotes the 1% significance level*

ii. *Analysis*

Like the ARMA model, regressing on $dlcpi$ finds a percentage point change in period-on-period inflation.

Most coefficients are insignificant, with only autoregressive and global energy prices being near a conventional significance level, indicating that changes in the money supply or nominal exchange rate have no measurable effect on inflation in Denmark. The effects of energy prices vary; a 1% increase in current global energy prices increases inflation by 1.97pp, but decreases inflation by 1.71pp in the next period, increasing it overall by 0.26pp in future periods.

The autoregressive terms also vary; in general, past increases in inflation increase current inflation: a 1pp increase in all past levels of inflation will on average increase current inflation by 0.466pp.

Section IV: Panel Data Estimation

Inflation will be modelled using the Fixed Effect, Random Effect, and Pooled OLS Models (FEM, REM, POLS). The units and their corresponding time periods are shown in Table VIII.

Table VIII

Unit	Time Period
Denmark	2000Q1-2023Q4 [no omissions]
Sweden	2000Q1-2023Q4 [no omissions]
Norway	2000Q1-2023Q4 [no omissions]

Iceland	2000Q1-2023Q4 [no omissions]
United Kingdom	2000Q1-2023Q4 [no omissions]

A. Testing each model

	POLS	FEM	REM
$dlcpi$	Coefficient (Std. Err)	Coefficient (Std. Err)	Coefficient (Std. Err)
lm	-0.00145* (0.000849)	-0.00128 (0.00115)	-0.00124 (0.00109)
lxr	0.00291 (0.00247)	-0.00425 (0.00320)	-0.00317 (0.00306)
$lgep$	0.00620*** (0.000935)	0.0172*** (0.0264)	0.00567*** (0.000961)
F	**0.0000*** **		N/A
$Breusch-Pagan$	**0.0000*** **	N/A	**0.0000*** **
$Hausman$	N/A	**0.1085**	

** denotes the 10% significance level*

**** denotes the 1% significance level*

Estimations and tests can be found for FEM/POLS, REM/POLS, and FEM/REM in Appendix 11, Appendix 12, and Appendix 13 respectively. Ultimately, REM is preferred.

B. Results of the REM

i. Estimation

After testing the model is re-estimated with cluster-robust standard errors.[11] The equation is:

$$dlcpi_{it}^{*} = \beta_0 + \beta_1 lm_{it}^{*} + \beta_2 lxr_{it}^{*} + \beta_3 lgep_{it}^{*} + \epsilon_{it}$$

Where $z_{it}^{*} = z_{it} - \lambda \bar{z}_{it}$ and $\lambda = 1 - \frac{\sigma_\epsilon}{\sqrt{T\sigma_u^2 + \sigma_\epsilon^2}}$.

Variable	Coefficient (Robust Std. Error)	p-value
lm	-0.00124 (0.00124)	0.318

[11] Appendix 14

$\boldsymbol{lxr}$	-0.00317 (0.00416)	0.446
$\boldsymbol{lgep}$	0.00567 (0.00125)	0.000***

**** denotes the 1% significance level*

ii. <u>Analysis</u>

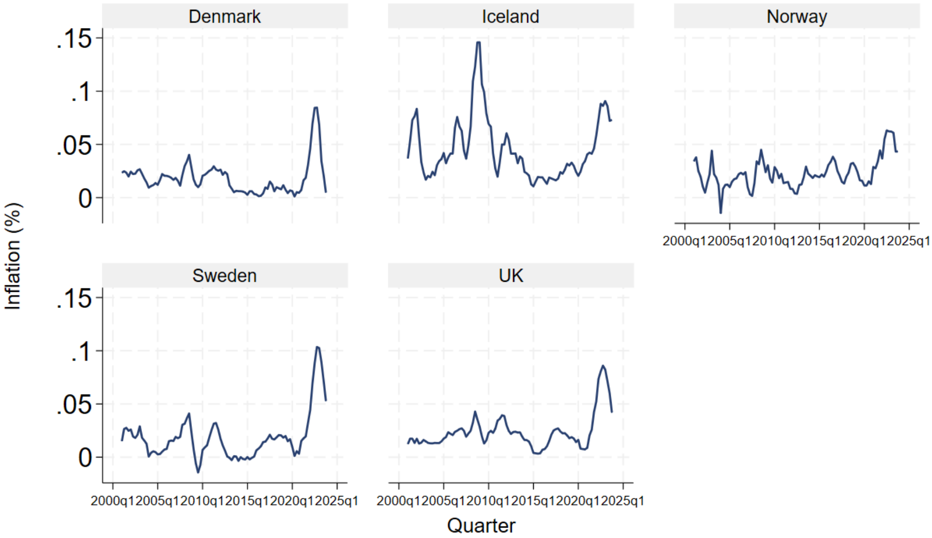
All variables are not significant at any conventional level except global energy prices. It is estimated that a 1% increase in global energy prices will increase inflation by 0.567pp in all sample countries. This supports our prior ARDL analysis that money supply and the exchange rate have no significant effect on inflation.

<u>Section V: Inflation Targeting Logit Estimation</u>

Previous inflation regressions estimated inflation as period-on-period inflation. However, inflation targeting in industrialised countries typically attempts to control for year-on-year (YoY) inflation (Hammond, 2012, p. 8). Consequently, YoY inflation will be used for assessing inflation targeting success; the YoY inflation for each country is shown in Figure VII and the equation is shown below.

$$inflation_{YoY} = \frac{cpi_t - cpi_{t-4}}{cpi_t}$$

Figure VII



I will be using a logistic model to fit the data as this model is present in the literature when estimating inflation targeting (Milas, Dergaides, Panagiotidis, & Papapanagiotou, 2024).

i. *Estimation*

The model is:

$$P(IT = 1) = \Lambda(\beta_1 + \beta_2 lgep + \beta_3 X)$$

Where $P(IT = 1)$ is the probability a country is under 2% inflation and X is an array of variables $X = [lm, lxr]$; an LR test is applied to examine whether the X variables should be included as the model is primarily meant to examine the impact of global energy prices.

X is significant: $LR\ \chi^2(2) = 27.94$, $Prob > \chi^2 = 0.0000$.[12] Consequently, the model is:

$$P(IT = 1) = \Lambda(\beta_1 + \beta_2 lgep + \beta_3 lm + \beta_4 lxr)$$

Table IX shows that the model correctly classified 61.88% of estimates, indicating the model is a good fit.[13]

[12] Appendix 15
[13] Appendix 16

Table IX

Logistic Model Estimation			
Prediction	Truly 1	Truly 0	Total
$\mathbf{Pr\ (IT = 1) \geq 0.5}$	120	79	199
$\mathbf{Pr(IT = 1) < 0.5}$	104	177	281
Total	224	256	480
Sensitivity	53.57%		
Specificity	69.14%		
Correctly Classified	61.88%		

Table X[14] and Table XI[15] present the marginal effects at average (MEA) and average marginal effects (AME), respectively.

Table X

Variable	MEA (Delta-method Std. Error)	p-value
$\boldsymbol{lgep}$	-0.426 (0.0678)	0.000***
$\boldsymbol{lxr}$	0.0713 (0.169)	0.673
$\boldsymbol{lm}$	0.282 (0.0598)	0.000***

Table XI

Variable	AME (Delta-method Std. Error)	p-value
$\boldsymbol{lgep}$	-0.385 (0.0510)	0.000***
$\boldsymbol{lxr}$	0.0644 (0.153)	0.673
$\boldsymbol{lm}$	0.255 (0.0491)	0.000***

ii. *Analysis*

Table X shows effects of a percentage increase of a variable from its average value. A 1% rise in global energy prices from its average its decreases the probability of being below 2%

[14] Appendix 20
[15] Appendix 21

inflation by 42.6%, indicating that rising global energy prices destabilises interest targeting regimes. A 1% rise in the money supply from its average increases the probability of being below 2% inflation by 28.2%, indicating it helps to stabilise inflation.

Table XI shows the effects of a percent increase in a variable averaged across all values, echoing findings from Table X. On average, a 1% increase in the global price of energy decreases chances of being below 2% inflation by 38.5%; on average, a 1% increase in the money supply increases chances of being below 2% inflation by 25.5%.

Effects of the exchange rate are insignificant in both estimates, indicating little impact on inflation.

Section VI: Conclusion

This paper analysed the determinants of inflation, and the success of inflation targeting, in Denmark, Norway, Sweden, Iceland and the UK. Proposed determinants of inflation were the broad money supply M3, the nominal effective exchange rate, and global energy prices.

Inflation was found to have significant autoregressive coefficients in all AR models, indicating that any increase or decrease in inflation today will propagate into the future; the ARMA model suggests that in Denmark, inflationary shocks dissipate slowly on average. While current theory supports the idea that the money supply and exchange rate depreciation have positive relationships with inflation, ARDL and REM regressions were unable to verify this. Theoretical arguments and empirical findings that global energy prices have a positive effect on inflation were verified.

Finally, the logistic regression to analyse effects on the inflation targeting regime confirmed, unlike other models, that money supply does have a significant effect; however, the empirical evidence suggests a larger money supply makes inflation likelier to stay within target, which is counter to theoretical assumptions.

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Appendix

Appendix 1

*Estimated using a foreach loop in Stata. The name of the variable, e.g., `lcpi`, is at the top of each section followed by the results of the BG test looking at 4 lags of the error term, up to a maximum of 5 lags in the ADF test. Each variable section is then followed by a dashed line to indicate the next variable's estimation has begun. Output has been split into two columns to reduce pagination. The ADF test includes a **trend term**.*

```
. foreach v of varlist lcpi lm lxr lgep {
  2.         display "`v'"
  3.         display "Lags: 0"
  4.         quietly regress D.`v' L.`v' trend
  5.         estat bgodfrey, lags(1/4) nomiss0
  6.         forvalues lags = 1/5 {
  7.                 display "Lags: `lags'"
  8.                 quietly regress D.`v' L(1/`lags')D.`v' L.`v' trend
  9.                 estat bgodfrey, lags(1/4) nomiss0
 10.         }
 11.         display "*-----------------*"
 12. }

lcpi
Lags: 0

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         15.522               1                   0.0001
       2     |         16.469               2                   0.0003
       3     |         18.263               3                   0.0004
       4     |         28.871               4                   0.0000
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 1

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.112               1                   0.7378
       2     |          2.358               2                   0.3076
       3     |         15.398               3                   0.0015
       4     |         22.773               4                   0.0001
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 2

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.284               1                   0.1307
       2     |         15.294               2                   0.0005
       3     |         14.431               3                   0.0024
       4     |         21.716               4                   0.0002
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 3

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         13.099               1                   0.0003
       2     |         20.590               2                   0.0000
       3     |         19.580               3                   0.0002
       4     |         19.510               4                   0.0006
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 4

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         10.241               1                   0.0014
       2     |          9.600               2                   0.0082
       3     |          9.516               3                   0.0232
       4     |         13.602               4                   0.0087
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 5

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.712               1                   0.3989
       2     |          0.758               2                   0.6844
       3     |          4.798               3                   0.1872
       4     |          5.159               4                   0.2714
---------------------------------------------------------------------------
                        H0: no serial correlation
*-----------------*
lm
Lags: 0

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.513               1                   0.1129
       2     |          3.532               2                   0.1710
       3     |          3.916               3                   0.2707
       4     |          4.498               4                   0.3428
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 1

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.045               1                   0.3065
       2     |          1.908               2                   0.3851
       3     |          2.318               3                   0.5091
       4     |          2.432               4                   0.6568
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 2

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.487               1                   0.4852
       2     |          0.954               2                   0.6205
       3     |          1.118               3                   0.7728
       4     |          1.954               4                   0.7442
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 3

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.674               1                   0.4115
       2     |          0.680               2                   0.7117
       3     |          1.444               3                   0.6953
       4     |          2.043               4                   0.7278
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 4

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.048               1                   0.8259
       2     |          0.884               2                   0.6429
       3     |          2.181               3                   0.5358
       4     |          7.039               4                   0.1338
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 5

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.815               1                   0.3668
       2     |          1.882               2                   0.3903
       3     |          6.664               3                   0.0834
       4     |          7.755               4                   0.1010
---------------------------------------------------------------------------
                        H0: no serial correlation
*-----------------*
lxr
Lags: 0

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.349               1                   0.5548
       2     |          1.141               2                   0.5654
       3     |          7.332               3                   0.0620
       4     |         10.069               4                   0.0393
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 1

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.524               1                   0.4692
       2     |          6.704               2                   0.0350
       3     |          9.631               3                   0.0220
       4     |          8.957               4                   0.0622
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 2

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          6.436               1                   0.0112
```

```
      2     |        9.533              2                   0.0085
      3     |       10.641              3                   0.0138
      4     |       10.119              4                   0.0385
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 3

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         3.419               1                   0.0644
       2     |         6.294               2                   0.0430
       3     |         6.598               3                   0.0859
       4     |         9.300               4                   0.0540
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 4

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         3.080               1                   0.0792
       2     |         3.800               2                   0.1496
       3     |         7.488               3                   0.0579
       4     |         8.155               4                   0.0861
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 5

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         1.058               1                   0.3036
       2     |         3.835               2                   0.1470
       3     |         4.354               3                   0.2257
       4     |         4.601               4                   0.3308
---------------------------------------------------------------------------
                        H0: no serial correlation
*-----------------*
lgep
Lags: 0

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |        14.588               1                   0.0001
       2     |        14.576               2                   0.0007
       3     |        14.406               3                   0.0024
       4     |        14.619               4                   0.0056
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 1

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         0.261               1                   0.6093
       2     |         0.293               2                   0.8636
       3     |         0.235               3                   0.9718
       4     |         0.340               4                   0.9871
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 2

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         0.039               1                   0.8443
       2     |         0.099               2                   0.9517
       3     |         0.266               3                   0.9664
       4     |         0.548               4                   0.9687
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 3

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         0.050               1                   0.8237
       2     |         0.200               2                   0.9049
       3     |         0.441               3                   0.9316
       4     |         1.328               4                   0.8566
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 4

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         0.104               1                   0.7469
       2     |         0.271               2                   0.8732
       3     |         0.899               3                   0.8257
       4     |         0.923               4                   0.9213
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 5

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         0.123               1                   0.7254
       2     |         0.876               2                   0.6452
       3     |         1.435               3                   0.6974
       4     |         2.940               4                   0.5679
---------------------------------------------------------------------------
                        H0: no serial correlation
*-----------------*
```

Appendix 2

ADF test using trend term for $lcpi, lm, lxr$ and drift term for $lgep$. Horizontal lines added to split output into variable sections.

```
. dfuller lcpi, lags(5) trend

Augmented Dickey-Fuller test for unit root

Variable: lcpi                          Number of obs  = 90
                                        Number of lags =  5

H0: Random walk with or without drift

                                       Dickey-Fuller
                   Test      -------- critical value ---------
              statistic           1%           5%          10%
--------------------------------------------------------------
 Z(t)            -2.131       -4.062       -3.460       -3.156
--------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5289
```

```
. dfuller lm, trend

Dickey-Fuller test for unit root        Number of obs  = 95
Variable: lm                            Number of lags =  0

H0: Random walk with or without drift

                                       Dickey-Fuller
                   Test      -------- critical value ---------
              statistic           1%           5%          10%
--------------------------------------------------------------
 Z(t)            -1.616       -4.051       -3.455       -3.153
--------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7861.
```

```
. dfuller lxr, lags(3) trend

Augmented Dickey-Fuller test for unit root

Variable: lxr                           Number of obs  = 92
                                        Number of lags =  3
```

```
H0: Random walk with or without drift

                                       Dickey-Fuller
                   Test      -------- critical value ---------
              statistic           1%           5%          10%
--------------------------------------------------------------
 Z(t)            -3.271       -4.058       -3.458       -3.155
--------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0712.
```

```
. dfuller lgep, lags(1) drift

Augmented Dickey-Fuller test for unit root

Variable: lgep                           Number of obs  = 94
                                         Number of lags =  1

H0: Random walk with drift, d = 0

                                      t-distribution
                   Test      -------- critical value ---------
              statistic           1%           5%          10%
--------------------------------------------------------------
 Z(t)            -2.568       -2.368       -1.662       -1.291
--------------------------------------------------------------
p-value for Z(t) = 0.0059
```

Appendix 3

*Estimated using a foreach loop in Stata. The name of the variable, e.g., lcpi, is at the top of each section followed by the results of the BG test looking at 4 lags of the error term, up to a maximum of 5 lags in the ADF test. Each variable section is then followed by a dashed line to indicate the next variable's estimation has begun. Output has been columnated to reduce pagination. The ADF test includes a **drift term***

```
. foreach v of varlist lcpi lm lxr lgep {
  2.         display "`v'"
  3.         display "Lags: 0"
  4.         quietly regress D.`v' L.`v'
  5.         estat bgodfrey, lags(1/4) nomiss0
  6.         forvalues lags = 1/5 {
  7.                 display "Lags: `lags'"
  8.                 quietly regress D.`v' L(1/`lags')D.`v' L.`v'
  9.                 estat bgodfrey, lags(1/4) nomiss0
 10.         }
 11.         display "*-----------------*"
 12. }
lcpi
Lags: 0

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         13.451               1                   0.0002
       2     |         14.315               2                   0.0008
       3     |         15.226               3                   0.0016
       4     |         21.778               4                   0.0002
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 1

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.300               1                   0.5839
       2     |          1.331               2                   0.5139
       3     |          9.225               3                   0.0264
       4     |         22.072               4                   0.0002
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 2

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.992               1                   0.3193
       2     |          8.887               2                   0.0118
       3     |         21.834               3                   0.0001
       4     |         21.661               4                   0.0002
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 3

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          7.893               1                   0.0050
       2     |         20.768               2                   0.0000
       3     |         20.442               3                   0.0001
       4     |         20.547               4                   0.0004
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 4

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         15.204               1                   0.0001
       2     |         15.393               2                   0.0005
       3     |         15.608               3                   0.0014
       4     |         18.000               4                   0.0012
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 5

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.482               1                   0.2235
       2     |          1.910               2                   0.3847
       3     |          4.187               3                   0.2420
       4     |          5.560               4                   0.2345
---------------------------------------------------------------------------
                        H0: no serial correlation
*-----------------*
lm
Lags: 0

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.122               1                   0.1452
       2     |          2.793               2                   0.2474
       3     |          3.303               3                   0.3472
       4     |          3.642               4                   0.4566
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 1

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.715               1                   0.3977
       2     |          1.701               2                   0.4272
       3     |          1.824               3                   0.6096
       4     |          2.000               4                   0.7357
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 2

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.674               1                   0.4118
       2     |          0.850               2                   0.6538
       3     |          1.059               3                   0.7870
       4     |          2.289               4                   0.6827
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 3

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.398               1                   0.5281
       2     |          0.463               2                   0.7934
```

lags(p)	chi2	df	Prob > chi2
3	1.657	3	0.6464
4	2.587	4	0.6292

H0: no serial correlation

Lags: 4

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.115	1	0.7350
2	1.354	2	0.5082
3	2.863	3	0.4132
4	6.626	4	0.1570

H0: no serial correlation

Lags: 5

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	1.232	1	0.2671
2	2.450	2	0.2938
3	6.109	3	0.1064
4	9.148	4	0.0575

H0: no serial correlation

----

lxr

Lags: 0

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.143	1	0.7049
2	0.873	2	0.6464
3	5.573	3	0.1343
4	9.625	4	0.0472

H0: no serial correlation

Lags: 1

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.484	1	0.4866
2	5.191	2	0.0746
3	9.390	3	0.0245
4	8.767	4	0.0672

H0: no serial correlation

Lags: 2

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	4.962	1	0.0259
2	9.383	2	0.0092
3	11.411	3	0.0097
4	10.156	4	0.0379

H0: no serial correlation

Lags: 3

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	4.735	1	0.0296
2	8.342	2	0.0154
3	8.134	3	0.0433
4	10.126	4	0.0384

H0: no serial correlation

Lags: 4

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	3.883	1	0.0488
2	4.222	2	0.1211
3	7.269	3	0.0638
4	7.522	4	0.1107

H0: no serial correlation

Lags: 5

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.713	1	0.3984
2	2.754	2	0.2523
3	2.880	3	0.4105
4	3.511	4	0.4762

H0: no serial correlation

----

lgep

Lags: 0

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	13.833	1	0.0002
2	13.977	2	0.0009
3	13.824	3	0.0032
4	14.161	4	0.0068

H0: no serial correlation

Lags: 1

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.466	1	0.4950
2	0.453	2	0.7972
3	0.350	3	0.9503
4	0.449	4	0.9783

H0: no serial correlation

Lags: 2

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.004	1	0.9503
2	0.076	2	0.9625
3	0.277	3	0.9642
4	0.451	4	0.9781

H0: no serial correlation

Lags: 3

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.058	1	0.8101
2	0.249	2	0.8831
3	0.401	3	0.9400
4	1.012	4	0.9080

H0: no serial correlation

Lags: 4

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.153	1	0.6956
2	0.275	2	0.8714
3	0.972	3	0.8080
4	1.621	4	0.8051

H0: no serial correlation

Lags: 5

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.096	1	0.7564
2	0.839	2	0.6572
3	1.488	3	0.6850
4	3.106	4	0.5402

H0: no serial correlation

Appendix 4

ADF test using drift term for $lcpi, lm, lxr$. Horizontal lines added to split output into variable sections.

```
. dfuller lcpi, lags(5) drift

Augmented Dickey-Fuller test for unit root

Variable: lcpi                           Number of obs  = 90
                                         Number of lags =  5

H0: Random walk with drift, d = 0

                                       t-distribution
                  Test      -------- critical value ---------
             statistic           1%           5%          10%
-------------------------------------------------------------
 Z(t)           -0.286       -2.372       -1.663       -1.292
-------------------------------------------------------------
p-value for Z(t) = 0.3879
```

```
. dfuller lm, drift

Dickey-Fuller test for unit root          Number of obs  = 95
Variable: lm                              Number of lags =  0

H0: Random walk with drift, d = 0

                                       t-distribution
                  Test      -------- critical value ---------
             statistic           1%           5%          10%
-------------------------------------------------------------
 Z(t)           -1.937       -2.367       -1.661       -1.291
-------------------------------------------------------------
p-value for Z(t) = 0.0279
```

```
. dfuller lxr, lags(4) drift

Augmented Dickey-Fuller test for unit root

Variable: lxr                            Number of obs  = 91
                                         Number of lags =  4

H0: Random walk with drift, d = 0

                                       t-distribution
                  Test      -------- critical value ---------
             statistic           1%           5%          10%
-------------------------------------------------------------
 Z(t)           -2.095       -2.371       -1.663       -1.292
-------------------------------------------------------------
p-value for Z(t) = 0.0196
```

Appendix 5

Estimated using a foreach loop in Stata. The ADF test includes a ***drift term***

```
. foreach v of varlist D.lcpi {
  2.         display "`v'"
  3.         display "Lags: 0"
  4.         quietly regress D.`v' L.`v'
  5.         estat bgodfrey, lags(1/4) nomiss0
  6.         forvalues lags = 1/5 {
  7.                 display "Lags: `lags'"
  8.                 quietly regress D.`v' L(1/`lags')D.`v' L.`v'
  9.                 estat bgodfrey, lags(1/4) nomiss0
 10.         }
 11.         display "*-----------------*"
 12. }
D.lcpi
Lags: 0

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.261               1                   0.6092
       2     |          1.283               2                   0.5265
       3     |          8.876               3                   0.0310
       4     |         22.001               4                   0.0002
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 1

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.920               1                   0.3374
       2     |          8.535               2                   0.0140
       3     |         21.670               3                   0.0001
       4     |         21.553               4                   0.0002
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 2

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
```

```
        1     |        7.627              1                   0.0058
        2     |       20.688              2                   0.0000
        3     |       20.412              3                   0.0001
        4     |       20.398              4                   0.0004
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 3

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
        1     |       15.287              1                   0.0001
        2     |       15.647              2                   0.0004
        3     |       15.757              3                   0.0013
        4     |       18.242              4                   0.0011
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 4

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
        1     |        1.411              1                   0.2348
        2     |        1.737              2                   0.4197
        3     |        4.249              3                   0.2358
        4     |        5.497              4                   0.2400
---------------------------------------------------------------------------
                        H0: no serial correlation
Lags: 5

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
        1     |        0.349              1                   0.5547
        2     |        3.125              2                   0.2096
        3     |        4.429              3                   0.2187
        4     |        5.378              4                   0.2507
---------------------------------------------------------------------------
                        H0: no serial correlation
```

Appendix 6

ADF test using drift term for dlcpi.

```
. dfuller d.lcpi, lags(4) drift

Augmented Dickey-Fuller test for unit root

Variable: D.lcpi                           Number of obs  = 90
                                           Number of lags =  4

H0: Random walk with drift, d = 0

                                      t-distribution
                 Test      -------- critical value ---------
              statistic           1%            5%          10%
--------------------------------------------------------------
 Z(t)            -4.114       -2.372        -1.663       -1.292
--------------------------------------------------------------
p-value for Z(t) = 0.0000
```

Appendix 7

```
. eststo ARMA: arimasel d.lcpi, ar(2) ma(2)
Model1: AR(0) MA(1)
Model2: AR(0) MA(2)
Model3: AR(1) MA(0)
Model4: AR(1) MA(1)
Model5: AR(1) MA(2)
Model6: AR(2) MA(0)
Model7: AR(2) MA(1)
Model8: AR(2) MA(2)

             |        AR         MA      Nparm        LLF        AIC        SIC
-------------+-----------------------------------------------------------------
      Model1 |         0          1          2   355.4688  -706.9376  -701.8299
      Model2 |         0          2          3   356.4954  -706.9908  -699.3292
      Model3 |         1          0          2   355.9882  -707.9764  -702.8686
      Model4 |         1          1          3   356.1419  -706.2838  -698.6222
      Model5 |         1          2          4   356.2946  -704.5892  -694.3737
      Model6 |         2          0          3   356.1105  -706.2211  -698.5594
      Model7 |         2          1          4   356.1431  -704.2863  -694.0708
      Model8 |         2          2          5   361.6745  -713.3489  -700.5795
```

Appendix 8

```
. arima dlcpi, ar(1) robust

(setting optimization to BHHH)
Iteration 0:  Log pseudolikelihood =  355.98779
Iteration 1:  Log pseudolikelihood =  355.98812
Iteration 2:  Log pseudolikelihood =  355.98816
Iteration 3:  Log pseudolikelihood =  355.98817
Iteration 4:  Log pseudolikelihood =  355.98818

ARIMA regression

Sample: 2000q2 thru 2023q4                      Number of obs     =         95
                                                Wald chi2(1)      =       7.32
Log pseudolikelihood = 355.9882                 Prob > chi2       =     0.0068

------------------------------------------------------------------------------
             |              Semirobust
       dlcpi | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
dlcpi        |
       _cons |   .0046215   .0009386     4.92   0.000     .0027819    .0064611
-------------+----------------------------------------------------------------
ARMA         |
          ar |
         L1. |    .380355   .1405789     2.71   0.007     .1048253    .6558846
-------------+----------------------------------------------------------------
      /sigma |   .0057014   .0005091    11.20   0.000     .0047036    .0066993
------------------------------------------------------------------------------
Note: The test of the variance against zero is one sided, and the two-sided
      confidence interval is truncated at zero.
```

Appendix 9

```
. arima dlcpi, ar(1/2) ma(1/2) robust

(setting optimization to BHHH)
Iteration 0:  Log pseudolikelihood =  347.23067
Iteration 1:  Log pseudolikelihood =  352.68152
Iteration 2:  Log pseudolikelihood =  353.68017
Iteration 3:  Log pseudolikelihood =  355.04277
Iteration 4:  Log pseudolikelihood =  359.79432
(switching optimization to BFGS)
Iteration 5:  Log pseudolikelihood =   361.0122
Iteration 6:  Log pseudolikelihood =  361.10737
Iteration 7:  Log pseudolikelihood =  361.39219
Iteration 8:  Log pseudolikelihood =  361.61468
Iteration 9:  Log pseudolikelihood =  361.65691
Iteration 10: Log pseudolikelihood =  361.65801
Iteration 11: Log pseudolikelihood =  361.67069
Iteration 12: Log pseudolikelihood =  361.67379
Iteration 13: Log pseudolikelihood =  361.67444
Iteration 14: Log pseudolikelihood =  361.67445

ARIMA regression

Sample: 2000q2 thru 2023q4                      Number of obs     =         95
                                                Wald chi2(4)      =     680.78
Log pseudolikelihood = 361.6745                 Prob > chi2       =     0.0000

------------------------------------------------------------------------------
             |              Semirobust
       dlcpi | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
dlcpi        |
       _cons |   .0045876   .0008768     5.23   0.000     .0028691    .0063061
-------------+----------------------------------------------------------------
ARMA         |
          ar |
         L1. |  -.8995348   .2194136    -4.10   0.000    -1.329578   -.4694921
         L2. |    .076611    .221312     0.35   0.729    -.3571526    .5103746
             |
          ma |
         L1. |   1.427597   .1399993    10.20   0.000     1.153203    1.701991
         L2. |   .5024687   .1556634     3.23   0.001      .197374    .8075633
-------------+----------------------------------------------------------------
      /sigma |   .0053414   .0005515     9.68   0.000     .0042605    .0064224
------------------------------------------------------------------------------
Note: The test of the variance against zero is one sided, and the two-sided
      confidence interval is truncated at zero.
```

Appendix 10

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi
L.Dlcpi	0.278*	0.284*	0.317*	0.278*	0.283*	0.316*	0.280*	0.285*	0.321*	0.247	0.250*	0.278*	0.246	0.249*	0.276*	0.248	0.250*	0.280*	0.227	0.223	0.250	0.227	0.221	0.248	0.231	0.224	0.254	0.327*
	(0.136)	(0.129)	(0.132)	(0.137)	(0.130)	(0.133)	(0.137)	(0.131)	(0.134)	(0.130)	(0.124)	(0.127)	(0.131)	(0.124)	(0.127)	(0.132)	(0.125)	(0.128)	(0.141)	(0.133)	(0.137)	(0.142)	(0.133)	(0.138)	(0.143)	(0.134)	(0.139)	(0.145)
L2.Dlcpi																												-0.107
																												(0.0847)
lm	-0.00451	-0.00219	-0.00310	-0.00450	-0.00182	-0.00274	-0.00541*	-0.00252	-0.00359	0.0200	0.0249*	0.0227*	0.0202	0.0258*	0.0236*	0.0203	0.0257*	0.0233*	0.0192	0.0239*	0.0219*	0.0194	0.0249*	0.0228*	0.0196	0.0249*	0.0226*	-0.00492*
	(0.00236)	(0.00220)	(0.00230)	(0.00259)	(0.00245)	(0.00253)	(0.00258)	(0.00249)	(0.00257)	(0.0106)	(0.0102)	(0.0105)	(0.0106)	(0.0104)	(0.0107)	(0.0107)	(0.0105)	(0.0108)	(0.0107)	(0.0102)	(0.0105)	(0.0107)	(0.0104)	(0.0107)	(0.0109)	(0.0106)	(0.0109)	(0.00241)
lxr	0.00884	-0.00258	0.00119	0.00930	0.0130	0.0158	0.0121	0.0148	0.0181	0.00200	-0.0105	-0.00715	0.00653	0.0101	0.0124	0.00953	0.0122	0.0148	-0.000623	-0.0145	-0.0112	0.00423	0.00692	0.00922	0.00738	0.00904	0.0117	0.00501
	(0.0207)	(0.0198)	(0.0196)	(0.0429)	(0.0416)	(0.0425)	(0.0429)	(0.0416)	(0.0424)	(0.0203)	(0.0185)	(0.0186)	(0.0421)	(0.0393)	(0.0401)	(0.0421)	(0.0392)	(0.0400)	(0.0206)	(0.0186)	(0.0187)	(0.0432)	(0.0397)	(0.0405)	(0.0429)	(0.0394)	(0.0403)	(0.0213)
lgep	0.00495**	0.0166***	0.0185***	0.00495**	0.0168***	0.0188***	0.00464**	0.0163***	0.0183***	0.00550**	0.0176***	0.0191***	0.00552**	0.0180***	0.0194***	0.00520**	0.0174***	0.0189***	0.00584**	0.0184***	0.0198***	0.00587**	0.0188***	0.0201***	0.00551**	0.0182***	0.0196***	0.00526**
	(0.00167)	(0.00312)	(0.00350)	(0.00169)	(0.00318)	(0.00350)	(0.00168)	(0.00318)	(0.00345)	(0.00173)	(0.00316)	(0.00345)	(0.00174)	(0.00325)	(0.00348)	(0.00173)	(0.00325)	(0.00344)	(0.00175)	(0.00319)	(0.00345)	(0.00177)	(0.00327)	(0.00347)	(0.00177)	(0.00326)	(0.00342)	(0.00173)
L.lgep		-0.0129***	-0.0197***		-0.0131***	-0.0198***		-0.0128***	-0.0199***		-0.0134***	-0.0187***		-0.0137***	-0.0188***		-0.0133***	-0.0189***		-0.0138***	-0.0186***		-0.0140***	-0.0188***		-0.0137***	-0.0188***	
		(0.00283)	(0.00525)		(0.00283)	(0.00519)		(0.00277)	(0.00507)		(0.00277)	(0.00506)		(0.00279)	(0.00500)		(0.00275)	(0.00488)		(0.00279)	(0.00510)		(0.00278)	(0.00504)		(0.00273)	(0.00491)	
L2.lgep			0.00536			0.00532			0.00565			0.00418			0.00411			0.00445			0.00388			0.00380			0.00414	
			(0.00352)			(0.00354)			(0.00349)			(0.00343)			(0.00345)			(0.00338)			(0.00345)			(0.00348)			(0.00341)	
L.lxr				-0.000564	-0.0192	-0.0181	-0.0460	-0.0506	-0.0536				-0.00556	-0.0256	-0.0243	-0.0569	-0.0628	-0.0644				-0.00597	-0.0267	-0.0255	-0.0551	-0.0603	-0.0620	
				(0.0477)	(0.0450)	(0.0459)	(0.0596)	(0.0564)	(0.0572)				(0.0462)	(0.0428)	(0.0438)	(0.0591)	(0.0554)	(0.0566)				(0.0473)	(0.0439)	(0.0448)	(0.0592)	(0.0551)	(0.0567)	
L2.lxr							0.0534	0.0375	0.0424							0.0602	0.0442	0.0477							0.0576	0.0399	0.0435	
							(0.0418)	(0.0410)	(0.0410)							(0.0408)	(0.0399)	(0.0403)							(0.0413)	(0.0405)	(0.0410)	
L.lm										-0.0241*	-0.0265**	-0.0250*	-0.0242*	-0.0269**	-0.0254*	-0.0253*	-0.0276**	-0.0261*	-0.0134	-0.0117	-0.0111	-0.0135	-0.0119	-0.0113	-0.0158	-0.0136	-0.0131	
										(0.00982)	(0.00943)	(0.00957)	(0.00980)	(0.00959)	(0.00970)	(0.0101)	(0.00989)	(0.01000)	(0.0164)	(0.0155)	(0.0155)	(0.0164)	(0.0157)	(0.0157)	(0.0171)	(0.0163)	(0.0164)	
L2.lm																			-0.00990	-0.0138	-0.0131	-0.00992	-0.0139	-0.0132	-0.00874	-0.0130	-0.0122	
																			(0.0114)	(0.0107)	(0.0107)	(0.0115)	(0.0108)	(0.0108)	(0.0117)	(0.0111)	(0.0112)	
_cons	0.00164	0.0273	0.0202	0.00196	0.0386	0.0309	-0.0330	0.0133	0.00164	0.0240	0.0529	0.0459	0.0273	0.0684	0.0607	-0.0109	0.0393	0.0286	0.0339	0.0675	0.0602	0.0374	0.0838	0.0760	-0.000359	0.0565	0.0455	0.0236
	(0.0782)	(0.0769)	(0.0755)	(0.0844)	(0.0802)	(0.0786)	(0.0889)	(0.0867)	(0.0860)	(0.0768)	(0.0723)	(0.0714)	(0.0821)	(0.0753)	(0.0744)	(0.0866)	(0.0822)	(0.0816)	(0.0781)	(0.0734)	(0.0727)	(0.0836)	(0.0771)	(0.0766)	(0.0893)	(0.0853)	(0.0851)	(0.0813)
N	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	93
aic	-701.8	-710.4	-709.8	-699.8	-708.5	-708.0	-698.9	-707.2	-706.8	-703.4	-713.2	-712.2	-701.4	-711.5	-710.4	-700.9	-710.5	-709.5	-701.9	-712.5	-711.3	-700.0	-710.8	-709.6	-699.4	-709.6	-708.5	-693.3
bic	-689.1	-695.1	-692.0	-684.5	-690.7	-687.6	-681.1	-686.8	-683.9	-688.1	-695.4	-691.8	-683.6	-691.2	-687.6	-680.6	-687.6	-684.1	-684.1	-692.1	-688.4	-679.6	-688.0	-684.2	-676.5	-684.2	-680.5	-678.1

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)
Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi	Dlcpi
0.301*	0.340*	0.327*	0.301*	0.339*	0.329*	0.303*	0.344*	0.284*	0.245	0.278*	0.284*	0.244	0.277*	0.285*	0.245	0.281*	0.266	0.222	0.255	0.266	0.221	0.253	0.269	0.223	0.258
(0.131)	(0.134)	(0.145)	(0.133)	(0.135)	(0.147)	(0.134)	(0.138)	(0.140)	(0.124)	(0.128)	(0.141)	(0.125)	(0.130)	(0.142)	(0.126)	(0.132)	(0.149)	(0.132)	(0.138)	(0.151)	(0.134)	(0.140)	(0.152)	(0.135)	(0.142)
0.00320	-0.00731	-0.106	0.00238	-0.00795	-0.106	0.000231	-0.0110	-0.0692	0.0611	0.0490	-0.0692	0.0600	0.0481	-0.0661	0.0590	0.0461	-0.0780	0.0523	0.0414	-0.0781	0.0511	0.0404	-0.0742	0.0507	0.0391
(0.0884)	(0.0904)	(0.0861)	(0.0889)	(0.0910)	(0.0869)	(0.0900)	(0.0920)	(0.0887)	(0.0906)	(0.0924)	(0.0896)	(0.0905)	(0.0923)	(0.0904)	(0.0907)	(0.0923)	(0.0891)	(0.0916)	(0.0932)	(0.0899)	(0.0913)	(0.0929)	(0.0908)	(0.0914)	(0.0929)
-0.00199	-0.00300	-0.00501	-0.00186	-0.00290	-0.00590*	-0.00256	-0.00376	0.0164	0.0255*	0.0228*	0.0164	0.0261*	0.0233*	0.0166	0.0260*	0.0230	0.0153	0.0243*	0.0218	0.0153	0.0249*	0.0224	0.0157	0.0249*	0.0222
(0.00229)	(0.00240)	(0.00264)	(0.00253)	(0.00262)	(0.00266)	(0.00260)	(0.00271)	(0.0112)	(0.0110)	(0.0114)	(0.0113)	(0.0113)	(0.0116)	(0.0114)	(0.0114)	(0.0117)	(0.0114)	(0.0111)	(0.0115)	(0.0114)	(0.0113)	(0.0117)	(0.0117)	(0.0115)	(0.0118)
-0.0102	-0.00618	0.000544	-0.00440	-0.00157	0.00328	-0.00237	0.000922	-0.000310	-0.0182	-0.0146	-0.000497	-0.00618	-0.00394	0.00249	-0.00386	-0.00124	-0.00287	-0.0216	-0.0181	-0.00226	-0.00845	-0.00624	0.000787	-0.00619	-0.00358
(0.0204)	(0.0199)	(0.0445)	(0.0420)	(0.0427)	(0.0447)	(0.0422)	(0.0429)	(0.0214)	(0.0198)	(0.0198)	(0.0450)	(0.0414)	(0.0420)	(0.0453)	(0.0416)	(0.0421)	(0.0217)	(0.0197)	(0.0197)	(0.0463)	(0.0418)	(0.0424)	(0.0462)	(0.0418)	(0.0424)
0.0171***	0.0190***	0.00524**	0.0171***	0.0191***	0.00493**	0.0166***	0.0186***	0.00561**	0.0185***	0.0198***	0.00561**	0.0186***	0.0200***	0.00529**	0.0181***	0.0195***	0.00601**	0.0192***	0.0204***	0.00601**	0.0193***	0.0206***	0.00566**	0.0188***	0.0201***
(0.00329)	(0.00368)	(0.00175)	(0.00333)	(0.00368)	(0.00174)	(0.00333)	(0.00363)	(0.00176)	(0.00330)	(0.00357)	(0.00178)	(0.00336)	(0.00359)	(0.00176)	(0.00337)	(0.00356)	(0.00178)	(0.00334)	(0.00359)	(0.00181)	(0.00340)	(0.00361)	(0.00181)	(0.00340)	(0.00357)
-0.0135***	-0.0205***		-0.0136***	-0.0205***		-0.0132***	-0.0205***		-0.0146***	-0.0198***		-0.0148***	-0.0198***		-0.0144***	-0.0198***		-0.0149***	-0.0197***		-0.0150***	-0.0197***		-0.0146***	-0.0198***
(0.00310)	(0.00548)		(0.00310)	(0.00548)		(0.00304)	(0.00532)		(0.00297)	(0.00525)		(0.00298)	(0.00523)		(0.00293)	(0.00508)		(0.00300)	(0.00531)		(0.00299)	(0.00528)		(0.00294)	(0.00513)
	0.00559			0.00557			0.00591			0.00419			0.00415			0.00449			0.00394			0.00389			0.00422
	(0.00352)			(0.00354)			(0.00350)			(0.00353)			(0.00355)			(0.00348)			(0.00353)			(0.00357)			(0.00350)
		0.00531	-0.00693	-0.00555	-0.0397	-0.0379	-0.0409				0.000225	-0.0146	-0.0130	-0.0502	-0.0509	-0.0522				-0.000725	-0.0160	-0.0144	-0.0486	-0.0489	-0.0503
		(0.0487)	(0.0451)	(0.0460)	(0.0604)	(0.0572)	(0.0582)				(0.0480)	(0.0438)	(0.0447)	(0.0608)	(0.0561)	(0.0575)				(0.0493)	(0.0449)	(0.0459)	(0.0609)	(0.0559)	(0.0576)
					0.0530	0.0368	0.0421							0.0590	0.0429	0.0465							0.0562	0.0390	0.0426
					(0.0418)	(0.0413)	(0.0415)							(0.0410)	(0.0395)	(0.0402)							(0.0414)	(0.0400)	(0.0407)
								-0.0208*	-0.0266*	-0.0247*	-0.0208*	-0.0269*	-0.0250*	-0.0220*	-0.0276*	-0.0256*	-0.00908	-0.0123	-0.0112	-0.00909	-0.0125	-0.0114	-0.0115	-0.0141	-0.0130
								(0.0104)	(0.0101)	(0.0102)	(0.0104)	(0.0103)	(0.0104)	(0.0107)	(0.0105)	(0.0106)	(0.0169)	(0.0163)	(0.0163)	(0.0169)	(0.0164)	(0.0164)	(0.0176)	(0.0169)	(0.0169)
																	-0.0107	-0.0131	-0.0124	-0.0107	-0.0132	-0.0125	-0.00946	-0.0123	-0.0115
																	(0.0114)	(0.0107)	(0.0107)	(0.0115)	(0.0109)	(0.0108)	(0.0116)	(0.0111)	(0.0112)
0.0599	0.0529	0.0211	0.0633	0.0557	-0.0135	0.0382	0.0264	0.0386	0.0821	0.0752	0.0385	0.0895	0.0819	0.000912	0.0609	0.0502	0.0485	0.0950	0.0879	0.0489	0.103	0.0954	0.0119	0.0762	0.0653
(0.0776)	(0.0752)	(0.0865)	(0.0811)	(0.0788)	(0.0913)	(0.0877)	(0.0865)	(0.0817)	(0.0754)	(0.0741)	(0.0856)	(0.0781)	(0.0771)	(0.0904)	(0.0854)	(0.0848)	(0.0828)	(0.0760)	(0.0750)	(0.0869)	(0.0793)	(0.0786)	(0.0926)	(0.0874)	(0.0872)
93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93
-701.7	-701.3	-691.3	-699.7	-699.3	-690.5	-698.3	-698.1	-693.8	-704.3	-703.2	-691.8	-702.4	-701.3	-691.3	-701.2	-700.3	-692.5	-703.4	-702.2	-690.5	-701.5	-700.3	-689.8	-700.2	-699.2
-684.0	-681.1	-673.6	-679.5	-676.5	-670.2	-675.5	-672.8	-676.1	-684.0	-680.4	-671.5	-679.6	-675.9	-668.5	-675.9	-672.4	-672.2	-680.6	-676.9	-667.7	-676.2	-672.5	-664.5	-672.4	-668.8

Appendix 11

```
. xtreg dlcpi lm lxr lgep, fe

Fixed-effects (within) regression               Number of obs      =       475
Group variable: countryID                       Number of groups   =         5
```

```
R-squared:                                      Obs per group:
     Within  = 0.0915                                         min =         95
     Between = 0.0248                                         avg =       95.0
     Overall = 0.0718                                         max =         95

                                                F(3, 467)         =      15.68
corr(u_i, Xb) = -0.0684                         Prob > F          =     0.0000

------------------------------------------------------------------------------
       dlcpi | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
          lm |  -.0012838   .0011473    -1.12   0.264    -.0035382    .0009707
         lxr |   -.004254   .0031981    -1.33   0.184    -.0105385    .0020305
        lgep |   .0056259   .0009738     5.78   0.000     .0037124    .0075394
       _cons |   .0172206   .0264191     0.65   0.515    -.0346944    .0691355
-------------+----------------------------------------------------------------
     sigma_u |  .00311715
     sigma_e |  .00727819
         rho |  .15499753   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(4, 467) = 14.31                     Prob > F = 0.0000
```

Appendix 12

```
. reg dlcpi lm lxr lgep

      Source |       SS           df       MS      Number of obs   =       475
-------------+----------------------------------   F(3, 471)       =     16.06
       Model |  .002840985         3  .000946995   Prob > F        =    0.0000
    Residual |  .027770526       471  .000058961   R-squared       =    0.0928
-------------+----------------------------------   Adj R-squared   =    0.0870
       Total |   .03061151       474  .000064581   Root MSE        =    .00768

------------------------------------------------------------------------------
       dlcpi | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
          lm |   -.001447   .0008487    -1.70   0.089    -.0031148    .0002207
         lxr |   .0029066   .0024725     1.18   0.240    -.0019518    .0077651
        lgep |   .0061984   .0009348     6.63   0.000     .0043616    .0080353
       _cons |  -.0169459   .0191463    -0.89   0.377    -.0545686    .0206768
------------------------------------------------------------------------------

. xtreg dlcpi lm lxr lgep, re

Random-effects GLS regression                   Number of obs     =        475
Group variable: countryID                       Number of groups  =          5

R-squared:                                      Obs per group:
     Within  = 0.0912                                         min =         95
     Between = 0.0021                                         avg =       95.0
     Overall = 0.0769                                         max =         95

                                                Wald chi2(3)      =      46.33
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000

------------------------------------------------------------------------------
       dlcpi | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
          lm |  -.0012355   .0010923    -1.13   0.258    -.0033764    .0009053
         lxr |  -.0031661    .003064    -1.03   0.301    -.0091715    .0028393
        lgep |    .005667    .000961     5.90   0.000     .0037835    .0075505
       _cons |   .0112128   .0250962     0.45   0.655    -.0379748    .0604005
-------------+----------------------------------------------------------------
     sigma_u |  .00222592
     sigma_e |  .00727819
         rho |  .08553384   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        dlcpi[countryID,t] = Xb + u[countryID] + e[countryID,t]

        Estimated results:
                         |       Var     SD = sqrt(Var)
                ---------+-----------------------------
                   dlcpi |   .0000646       .0080362
                       e |    .000053       .0072782
                       u |   4.95e-06       .0022259

        Test: Var(u) = 0
                             chibar2(01) =   151.19
                          Prob > chibar2 =   0.0000
```

Appendix 13

```
. eststo fixed: qui xtreg dlcpi lm lxr lgep, fe

. xtreg dlcpi lm lxr lgep, re

Random-effects GLS regression                   Number of obs     =        475
Group variable: countryID                       Number of groups  =          5
```

```
R-squared:                                      Obs per group:
     Within  = 0.0912                                         min =         95
     Between = 0.0021                                         avg =       95.0
     Overall = 0.0769                                         max =         95

                                                Wald chi2(3)      =      46.33
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000

------------------------------------------------------------------------------
       dlcpi | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
          lm |  -.0012355   .0010923    -1.13   0.258    -.0033764    .0009053
         lxr |  -.0031661    .003064    -1.03   0.301    -.0091715    .0028393
        lgep |    .005667    .000961     5.90   0.000     .0037835    .0075505
       _cons |   .0112128   .0250962     0.45   0.655    -.0379748    .0604005
-------------+----------------------------------------------------------------
     sigma_u |  .00222592
     sigma_e |  .00727819
         rho |  .08553384   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. hausman fixed

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |     fixed          .          Difference       Std. err.
-------------+----------------------------------------------------------------
          lm |   -.0012838    -.0012355       -.0000482        .0003508
         lxr |    -.004254    -.0031661       -.0010879        .0009165
        lgep |    .0056259      .005667       -.0000411        .0001573
------------------------------------------------------------------------------
                          b = Consistent under H0 and Ha; obtained from xtreg.
           B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

    chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
            =   6.07
Prob > chi2 = 0.1085
(V_b-V_B is not positive definite)
```

Appendix 14

```
. xtreg dlcpi lm lxr lgep, re robust

Random-effects GLS regression                   Number of obs     =        475
Group variable: countryID                       Number of groups  =          5

R-squared:                                      Obs per group:
     Within  = 0.0912                                         min =         95
     Between = 0.0021                                         avg =       95.0
     Overall = 0.0769                                         max =         95

                                                Wald chi2(3)      =    1290.99
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000

                              (Std. err. adjusted for 5 clusters in countryID)
------------------------------------------------------------------------------
             |               Robust
       dlcpi | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
          lm |  -.0012355   .0012365    -1.00   0.318     -.003659    .0011879
         lxr |  -.0031661   .0041577    -0.76   0.446     -.011315    .0049828
        lgep |    .005667   .0012543     4.52   0.000     .0032086    .0081255
       _cons |   .0112128   .0200629     0.56   0.576    -.0281097    .0505354
-------------+----------------------------------------------------------------
     sigma_u |  .00222592
     sigma_e |  .00727819
         rho |  .08553384   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix 15

```
. logistic it lgep

Logistic regression                                     Number of obs =    480
                                                        LR chi2(1)    =  20.34
                                                        Prob > chi2   = 0.0000
Log likelihood = -321.47399                             Pseudo R2     = 0.0307

------------------------------------------------------------------------------
          it | Odds ratio  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
        lgep |   .3874224    .083324    -4.41   0.000     .2541642    .5905479
       _cons |   94.15234   100.2411     4.27   0.000     11.68377    758.7161
------------------------------------------------------------------------------
Note: _cons estimates baseline odds.

. estimates store restricted

. logistic it lgep lm lxr
```

```
Logistic regression                                     Number of obs =    480
                                                        LR chi2(3)    =  48.28
                                                        Prob > chi2   = 0.0000
Log likelihood = -307.50326                             Pseudo R2     = 0.0728

------------------------------------------------------------------------------
          it | Odds ratio   Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
        lgep |   .1803496   .0491709    -6.28   0.000     .1056918    .3077434
          lm |   3.109738   .7472943     4.72   0.000     1.941661    4.980514
         lxr |   1.331985   .9045517     0.42   0.673     .3519231    5.041395
       _cons |   .0000972   .0005092    -1.76   0.078     3.38e-09    2.797531
------------------------------------------------------------------------------
Note: _cons estimates baseline odds.

. estimates store full

. lrtest full restricted

Likelihood-ratio test
Assumption: restricted nested within full

 LR chi2(2) =  27.94
Prob > chi2 = 0.0000
```

Appendix 16

```
. logistic it lgep lxr lm

Logistic regression                                     Number of obs =    480
                                                        LR chi2(3)    =  48.28
                                                        Prob > chi2   = 0.0000
Log likelihood = -307.50326                             Pseudo R2     = 0.0728

------------------------------------------------------------------------------
          it | Odds ratio   Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
        lgep |   .1803496   .0491709    -6.28   0.000     .1056918    .3077434
         lxr |   1.331985   .9045517     0.42   0.673     .3519231    5.041395
          lm |   3.109738   .7472943     4.72   0.000     1.941661    4.980514
       _cons |   .0000972   .0005092    -1.76   0.078     3.38e-09    2.797531
------------------------------------------------------------------------------
Note: _cons estimates baseline odds.

. estat class

Logistic model for it

              -------- True --------
Classified |         D            ~D  |      Total
-----------+--------------------------+-----------
     +     |       120            79  |        199
     -     |       104           177  |        281
-----------+--------------------------+-----------
   Total   |       224           256  |        480

Classified + if predicted Pr(D) >= .5
True D defined as it != 0
--------------------------------------------------
Sensitivity                     Pr( +| D)   53.57%
Specificity                     Pr( -|~D)   69.14%
Positive predictive value       Pr( D| +)   60.30%
Negative predictive value       Pr(~D| -)   62.99%
--------------------------------------------------
False + rate for true ~D        Pr( +|~D)   30.86%
False - rate for true D         Pr( -| D)   46.43%
False + rate for classified +   Pr(~D| +)   39.70%
False - rate for classified -   Pr( D| -)   37.01%
--------------------------------------------------
Correctly classified                        61.88%
--------------------------------------------------
```

Appendix 17

```
. forvalues lags = 1/5 {
  2.         display "AR lags: `lags'"
  3.         eststo: quietly regress Dlcpi L(1/`lags').Dlcpi L(0/1).lm lxr L(0/1).lxr
  4.         estat bgodfrey, lags(1/5)
  5. }
AR lags: 1
(est1 stored)

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.096               1                   0.7572
       2     |          0.251               2                   0.8818
       3     |          0.448               3                   0.9303
       4     |         16.222               4                   0.0027
       5     |         19.089               5                   0.0018
---------------------------------------------------------------------------
                        H0: no serial correlation
```

```
AR lags: 2
(est2 stored)

Breusch–Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.056               1                   0.8123
       2     |          0.082               2                   0.9597
       3     |          0.763               3                   0.8583
       4     |         15.805               4                   0.0033
       5     |         18.239               5                   0.0027
---------------------------------------------------------------------------
                        H0: no serial correlation
AR lags: 3
(est3 stored)

Breusch–Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          3.479               1                   0.0621
       2     |          7.552               2                   0.0229
       3     |          7.891               3                   0.0483
       4     |         19.931               4                   0.0005
       5     |         20.996               5                   0.0008
---------------------------------------------------------------------------
                        H0: no serial correlation
AR lags: 4
(est4 stored)

Breusch–Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         11.177               1                   0.0008
       2     |         14.189               2                   0.0008
       3     |         15.179               3                   0.0017
       4     |         15.275               4                   0.0042
       5     |         18.148               5                   0.0028
---------------------------------------------------------------------------
                        H0: no serial correlation
AR lags: 5
(est5 stored)

Breusch–Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.819               1                   0.1774
       2     |          1.982               2                   0.3712
       3     |          3.104               3                   0.3758
       4     |          7.086               4                   0.1314
       5     |         10.393               5                   0.0648
---------------------------------------------------------------------------
                        H0: no serial correlation
```

Appendix 18

```
arima Dlcpi, ar(1/4) ma(1/2) robust

(setting optimization to BHHH)
Iteration 0:  Log pseudolikelihood =  353.88446
Iteration 1:  Log pseudolikelihood =  354.30768
Iteration 2:  Log pseudolikelihood =  354.67405
Iteration 3:  Log pseudolikelihood =  356.86616
Iteration 4:  Log pseudolikelihood =  362.36155
(switching optimization to BFGS)
Iteration 5:  Log pseudolikelihood =  364.40223
Iteration 6:  Log pseudolikelihood =  365.41376
Iteration 7:  Log pseudolikelihood =  365.48237
Iteration 8:  Log pseudolikelihood =  365.61532
Iteration 9:  Log pseudolikelihood =  365.62791
Iteration 10: Log pseudolikelihood =   365.6486
Iteration 11: Log pseudolikelihood =  365.66494
Iteration 12: Log pseudolikelihood =  365.67431
Iteration 13: Log pseudolikelihood =  365.67676
Iteration 14: Log pseudolikelihood =  365.67715
(switching optimization to BHHH)
Iteration 15: Log pseudolikelihood =  365.67716

ARIMA regression

Sample: 2000q2 thru 2023q4                      Number of obs     =         95
                                                Wald chi2(6)      =      60.95
Log pseudolikelihood = 365.6772                 Prob > chi2       =     0.0000

------------------------------------------------------------------------------
             |              Semirobust
       Dlcpi | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
Dlcpi        |
```

```
       _cons |   .0045145    .001155     3.91   0.000     .0022507    .0067783
-------------+----------------------------------------------------------------
ARMA         |
          ar |
         L1. |  -.1539197   .6606914    -0.23   0.816    -1.448851    1.141012
         L2. |  -.0302372   .6519198    -0.05   0.963    -1.307976    1.247502
         L3. |  -.0397128   .2581571    -0.15   0.878    -.5456914    .4662658
         L4. |   .4167652   .1567917     2.66   0.008     .1094591    .7240713
             |
          ma |
         L1. |   .6194411   .8487993     0.73   0.466    -1.044175    2.283057
         L2. |   .2506852   .4961058     0.51   0.613    -.7216644    1.223035
-------------+----------------------------------------------------------------
      /sigma |   .0051211   .0005147     9.95   0.000     .0041124    .0061298
------------------------------------------------------------------------------
Note: The test of the variance against zero is one sided, and the two-sided
      confidence interval is truncated at zero.
```

Appendix 19

```
. arima Dlcpi, ar(1/3) ma(1/2) robust

(setting optimization to BHHH)
Iteration 0:  Log pseudolikelihood =  352.89905
Iteration 1:  Log pseudolikelihood =   354.1232
Iteration 2:  Log pseudolikelihood =  354.82793
Iteration 3:  Log pseudolikelihood =  361.49586
Iteration 4:  Log pseudolikelihood =  367.28448
(switching optimization to BFGS)
Iteration 5:  Log pseudolikelihood =   370.8931
Iteration 6:  Log pseudolikelihood =  371.30418
Iteration 7:  Log pseudolikelihood =  371.63834
Iteration 8:  Log pseudolikelihood =  371.78118
Iteration 9:  Log pseudolikelihood =  371.84392
Iteration 10: Log pseudolikelihood =  371.98394
Iteration 11: Log pseudolikelihood =  372.04511
Iteration 12: Log pseudolikelihood =  372.05825
Iteration 13: Log pseudolikelihood =  372.06114
Iteration 14: Log pseudolikelihood =  372.06122
(switching optimization to BHHH)
Iteration 15: Log pseudolikelihood =  372.06123
Iteration 16: Log pseudolikelihood =  372.06123  (backed up)
Iteration 17: Log pseudolikelihood =  372.06123  (backed up)
Iteration 18: Log pseudolikelihood =  372.06123  (not concave)
Iteration 19: Log pseudolikelihood =  372.06123
(switching optimization to BFGS)
Iteration 20: Log pseudolikelihood =  372.06123  (backed up)
Iteration 21: Log pseudolikelihood =  372.06123

ARIMA regression

Sample: 2000q2 thru 2023q4                      Number of obs     =         95
                                                Wald chi2(5)      =   9.15e+12
Log pseudolikelihood = 372.0612                 Prob > chi2       =     0.0000

------------------------------------------------------------------------------
             |             Semirobust
       Dlcpi | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
Dlcpi        |
       _cons |   .0046486   .0010271     4.53   0.000     .0026354    .0066617
-------------+----------------------------------------------------------------
ARMA         |
          ar |
         L1. |    .605816   .1250264     4.85   0.000     .3607687    .8508632
         L2. |  -1.008781   .0223089   -45.22   0.000    -1.052506   -.9650567
         L3. |   .5582308   .1307205     4.27   0.000     .3020234    .8144382
             |
          ma |
         L1. |  -.1625848   .0830045    -1.96   0.050    -.3252705     .000101
         L2. |          1   1.92e-06  5.2e+05   0.000     .9999962    1.000004
-------------+----------------------------------------------------------------
      /sigma |   .0046467   .0004254    10.92   0.000     .0038129    .0054806
------------------------------------------------------------------------------
Note: The test of the variance against zero is one sided, and the two-sided
      confidence interval is truncated at zero.
```

Appendix 20

```
. margins, dydx(*) atmeans

Conditional marginal effects                               Number of obs = 480
Model VCE: OIM

Expression: Pr(it), predict()
dy/dx wrt:  lm lxr lgep
At: lm   = 14.28433 (mean)
    lxr  = 4.702961 (mean)
    lgep = 4.938275 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   std. err.      z    P>|z|     [95% conf. interval]
```

```
-------------+----------------------------------------------------------------
          lm |   .2821887   .0597815     4.72   0.000     .1650193    .3993582
         lxr |   .0713022    .168909     0.42   0.673    -.2597533    .4023577
        lgep |  -.4260316   .0678015    -6.28   0.000    -.5589201   -.2931431
------------------------------------------------------------------------------
```

Appendix 21

```
. margins, dydx(*)

Average marginal effects                                   Number of obs = 480
Model VCE: OIM

Expression: Pr(it), predict()
dy/dx wrt:  lm lxr lgep

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
          lm |    .255002   .0491422     5.19   0.000      .158685     .351319
         lxr |   .0644328   .1525415     0.42   0.673    -.2345431    .3634087
        lgep |  -.3849867   .0510444    -7.54   0.000    -.4850318   -.2849416
------------------------------------------------------------------------------
```

Appendix 22

Country	Year	CPI	M	XR	GEP
Denmark	2000-Q1	75.43	544848	87.47	65.11588
Denmark	2000-Q2	76.29	547345	87.46	68.41304
Denmark	2000-Q3	76.37	528715	85.43	77.47352
Denmark	2000-Q4	76.88	507134	86.88	83.47962
Denmark	2001-Q1	77.23	539457	88.37	77.00172
Denmark	2001-Q2	78.23	553418	87	72.29822
Denmark	2001-Q3	78.20	577537	89.42	64.42305
Denmark	2001-Q4	78.43	546402	88.82	51.7029
Denmark	2002-Q1	79.17	546185	88.16	53.32751
Denmark	2002-Q2	80.00	564875	90.16	62.74335
Denmark	2002-Q3	80.00	591127	90.92	65.27137
Denmark	2002-Q4	80.50	611199	91.73	68.73497
Denmark	2003-Q1	81.33	769030.6	94	83.64521
Denmark	2003-Q2	81.83	813925.9	95.71	73.31
Denmark	2003-Q3	81.47	804375.9	94.56	74.8078
Denmark	2003-Q4	81.67	797960.2	96.34	77.97722
Denmark	2004-Q1	82.10	904526.5	96.07	85.41406
Denmark	2004-Q2	82.73	903858.8	95.89	94.06901
Denmark	2004-Q3	82.43	900187.3	96.05	102.9367
Denmark	2004-Q4	82.80	838414.3	97.41	109.9186
Denmark	2005-Q1	83.10	864338.2	96.65	114.9754
Denmark	2005-Q2	84.13	939591.6	94.75	125.6224
Denmark	2005-Q3	84.30	948963.5	94.67	149.9138
Denmark	2005-Q4	84.53	990974.8	94.25	151.7998
Denmark	2006-Q1	84.83	1048928	94.36	148.562
Denmark	2006-Q2	85.83	1044634	95.63	160.0213
Denmark	2006-Q3	85.90	1074177	95.63	160.1574
Denmark	2006-Q4	85.97	1081853	95.84	144.0664
Denmark	2007-Q1	86.43	1154050	96.26	142.6794
Denmark	2007-Q2	87.20	1159683	96.31	158.9655

Denmark	2007-Q3	86.87	1205903	96.71	169.3849
Denmark	2007-Q4	87.83	1219234	97.69	201.078
Denmark	2008-Q1	89.07	1333667	99.12	223.6517
Denmark	2008-Q2	90.27	1344689	99.05	279.7467
Denmark	2008-Q3	90.50	1365583	97.63	273.0155
Denmark	2008-Q4	90.40	1440043	99.91	153.8137
Denmark	2009-Q1	90.63	1585819	100.76	120.6482
Denmark	2009-Q2	91.37	1590255	100.99	135.3894
Denmark	2009-Q3	91.40	1650386	100.86	148.9652
Denmark	2009-Q4	91.53	1552182	100.88	166.084
Denmark	2010-Q1	92.53	1565894	97.54	175.9608
Denmark	2010-Q2	93.37	1590244	94.37	176.2554
Denmark	2010-Q3	93.57	1453105	95	171.6313
Denmark	2010-Q4	93.90	1488658	94.83	190.2588
Denmark	2011-Q1	95.03	1350947	95.91	219.5917
Denmark	2011-Q2	96.20	1285336	96.57	241.9276
Denmark	2011-Q3	96.10	1326945	96.09	233.3416
Denmark	2011-Q4	96.33	1341033	95.32	231.1862
Denmark	2012-Q1	97.60	1486451	94.41	242.8439
Denmark	2012-Q2	98.30	1462908	93.56	225.0866
Denmark	2012-Q3	98.47	1466950	92.93	223.085
Denmark	2012-Q4	98.50	1380792	93.57	221.4684
Denmark	2013-Q1	98.73	1268374	93.72	227.321
Denmark	2013-Q2	99.13	1213403	95.07	218.7575
Denmark	2013-Q3	98.97	1198748	95.68	229.5335
Denmark	2013-Q4	99.13	1190746	96.98	227.9075
Denmark	2014-Q1	99.33	1205490	97.49	229.4645
Denmark	2014-Q2	99.73	1226402	96.8	230.6925
Denmark	2014-Q3	99.53	1271047	95.75	216.9077
Denmark	2014-Q4	99.60	1340333	96.15	172.218
Denmark	2015-Q1	99.60	1409065	91.79	127.9972
Denmark	2015-Q2	100.33	1472939	92.82	134.0564
Denmark	2015-Q3	100.13	1482362	94.47	113.7305
Denmark	2015-Q4	99.93	1502359	93.68	100.1444
Denmark	2016-Q1	99.90	1449874	94.6	81.02994
Denmark	2016-Q2	100.47	1506643	95.23	100.2401
Denmark	2016-Q3	100.30	1451791	95.42	103.2608
Denmark	2016-Q4	100.33	1443999	94.98	115.4691
Denmark	2017-Q1	100.87	1483209	94.87	123.0723
Denmark	2017-Q2	101.30	1519955	96.23	113.8648
Denmark	2017-Q3	101.83	1497568	97.37	118.1562
Denmark	2017-Q4	101.60	1486878	97.79	138.1095
Denmark	2018-Q1	101.47	1467769	98.4	149.1056
Denmark	2018-Q2	102.30	1504671	97.98	159.2765

Denmark	2018-Q3	102.73	1484004	99.45	166.749
Denmark	2018-Q4	102.40	1444197	98.4	151.0079
Denmark	2019-Q1	102.67	1457211	97.81	135.0537
Denmark	2019-Q2	103.07	1470591	98.4	134.1393
Denmark	2019-Q3	103.17	1467413	98.31	121.7694
Denmark	2019-Q4	103.10	1481422	97.76	126.1776
Denmark	2020-Q1	103.30	1503450	99.66	102.8085
Denmark	2020-Q2	103.17	1580147	99.99	68.76653
Denmark	2020-Q3	103.70	1594749	101.34	90.31376
Denmark	2020-Q4	103.57	1653672	101.16	104.9307
Denmark	2021-Q1	104.03	1660705	100.46	139.4159
Denmark	2021-Q2	104.87	1660342	100.48	156.2154
Denmark	2021-Q3	105.67	1664364	100.15	192.6785
Denmark	2021-Q4	106.83	1658998	99.77	244.045
Denmark	2022-Q1	109.07	1651784	99.55	277.7365
Denmark	2022-Q2	112.67	1732447	99.29	311.7772
Denmark	2022-Q3	115.40	1808152	98.8	350.1239
Denmark	2022-Q4	116.70	1833211	100.76	258.4067
Denmark	2023-Q1	117.07	1854009	101.39	203.6714
Denmark	2023-Q2	116.67	1841922	102.64	175.8058
Denmark	2023-Q3	117.87	1882319	103.24	189.2505
Denmark	2023-Q4	117.23	1922206	102.84	189.2923
UK	2000-Q1	72.8	885160	129.31	65.11588
UK	2000-Q2	73.46667	920679	125.13	68.41304
UK	2000-Q3	73.46667	920246	125.4	77.47352
UK	2000-Q4	73.93333	937378	126.86	83.47962
UK	2001-Q1	73.7	982075	125.96	77.00172
UK	2001-Q2	74.76667	997434	127.23	72.29822
UK	2001-Q3	74.76667	1018918	128.19	64.42305
UK	2001-Q4	74.93333	1023825	128.23	51.7029
UK	2002-Q1	75	1037198	128.28	53.32751
UK	2002-Q2	75.73333	1053359	126.32	62.74335
UK	2002-Q3	75.8	1068215	130.73	65.27137
UK	2002-Q4	76.16667	1065938	130.05	68.73497
UK	2003-Q1	76.13333	1086546	125.19	83.64521
UK	2003-Q2	76.76667	1118734	124.6	73.31
UK	2003-Q3	76.8	1131657	123.33	74.8078
UK	2003-Q4	77.16667	1154822	126.26	77.97722
UK	2004-Q1	77.16667	1199007	131.87	85.41406
UK	2004-Q2	77.8	1237892	133.07	94.06901
UK	2004-Q3	77.83333	1241290	129.95	102.9367
UK	2004-Q4	78.33333	1263843	130.37	109.9186
UK	2005-Q1	78.53333	1303305	129.77	114.9754
UK	2005-Q2	79.3	1360132	130.58	125.6224

UK	2005-Q3	79.7	1390408	128.95	149.9138
UK	2005-Q4	80.1	1424566	127.4	151.7998
UK	2006-Q1	80.2	1489864	125.74	148.562
UK	2006-Q2	81.23333	1523221	129.1	160.0213
UK	2006-Q3	81.73333	1568903	131.52	160.1574
UK	2006-Q4	82.26667	1613079	133.02	144.0664
UK	2007-Q1	82.43333	1666884	131.68	142.6794
UK	2007-Q2	83.3	1743928	132.73	158.9655
UK	2007-Q3	83.33333	1783727	131.2	169.3849
UK	2007-Q4	84.13333	1817043	126.79	201.078
UK	2008-Q1	84.53333	1939942	119.89	223.6517
UK	2008-Q2	86.1	1965777	117.34	279.7467
UK	2008-Q3	87.06667	1979156	113.23	273.0155
UK	2008-Q4	87.23333	2137477	99.77	153.8137
UK	2009-Q1	87.03333	2184558	98.26	120.6482
UK	2009-Q2	87.83333	2145521	106.75	135.3894
UK	2009-Q3	88.2	2192640	103.19	148.9652
UK	2009-Q4	88.63333	2194011	101.99	166.084
UK	2010-Q1	89.06667	2405016	98.07	175.9608
UK	2010-Q2	90.06667	2378543	102.61	176.2554
UK	2010-Q3	90.26667	2365930	102.74	171.6313
UK	2010-Q4	91.06667	2323609	101.67	190.2588
UK	2011-Q1	92.23333	2347111	101.5	219.5917
UK	2011-Q2	93.43333	2343657	99.67	241.9276
UK	2011-Q3	93.96667	2345838	100.33	233.3416
UK	2011-Q4	94.73333	2266224	102.46	231.1862
UK	2012-Q1	95.1	2269930	102.91	242.8439
UK	2012-Q2	95.8	2286645	105.14	225.0866
UK	2012-Q3	96.06667	2308780	106.5	223.085
UK	2012-Q4	97.03333	2327083	105.57	221.4684
UK	2013-Q1	97.43333	2365874	99.81	227.321
UK	2013-Q2	98.06667	2405517	102.26	218.7575
UK	2013-Q3	98.36667	2401599	104.48	229.5335
UK	2013-Q4	98.93333	2362530	106.7	227.9075
UK	2014-Q1	99.03333	2373954	108.23	229.4645
UK	2014-Q2	99.66667	2369611	110.82	230.6925
UK	2014-Q3	99.83333	2368315	110.52	216.9077
UK	2014-Q4	99.96667	2355042	110.44	172.218
UK	2015-Q1	99.43333	2367424	114.11	127.9972
UK	2015-Q2	100.0333	2358527	116.37	134.0564
UK	2015-Q3	100.1667	2371473	116.63	113.7305
UK	2015-Q4	100.3333	2387951	116.18	100.1444
UK	2016-Q1	100.1333	2440460	108.8	81.02994
UK	2016-Q2	100.8	2540055	107.9	100.2401

UK	2016-Q3	101.2	2603111	99.9	103.2608
UK	2016-Q4	101.8667	2623525	99.69	115.4691
UK	2017-Q1	102.3	2701204	97.28	123.0723
UK	2017-Q2	103.4	2732932	97.66	113.8648
UK	2017-Q3	103.9333	2784804	97.71	118.1562
UK	2017-Q4	104.7	2785885	99.14	138.1095
UK	2018-Q1	104.8333	2779712	100.09	149.1056
UK	2018-Q2	105.7667	2827878	99.54	159.2765
UK	2018-Q3	106.3333	2848633	99.74	166.749
UK	2018-Q4	106.9	2897741	97.86	151.0079
UK	2019-Q1	106.7333	2840100	101.62	135.0537
UK	2019-Q2	107.8	2874566	98.3	134.1393
UK	2019-Q3	108.2333	2886847	97.74	121.7694
UK	2019-Q4	108.4333	2886737	102.76	126.1776
UK	2020-Q1	108.5	3081384	98.43	102.8085
UK	2020-Q2	108.6667	3182092	98.79	68.76653
UK	2020-Q3	109.0667	3206464	99.2	90.31376
UK	2020-Q4	109.2333	3250823	99.84	104.9307
UK	2021-Q1	109.4667	3303094	104.62	139.4159
UK	2021-Q2	110.9333	3374829	104.91	156.2154
UK	2021-Q3	111.9667	3446725	104.43	192.6785
UK	2021-Q4	114.0667	3488172	104.69	244.045
UK	2022-Q1	115.5	3544223	105.56	277.7365
UK	2022-Q2	119.7333	3566080	102.46	311.7772
UK	2022-Q3	121.7667	3704873	99.09	350.1239
UK	2022-Q4	124.8	3588323	102.32	258.4067
UK	2023-Q1	125.8667	3568912	101.39	203.6714
UK	2023-Q2	128.9333	3560863	105.78	175.8058
UK	2023-Q3	129.5	3543629	105.98	189.2505
UK	2023-Q4	130.2333	3529941	106.19	189.2923
Iceland	2000-Q1	69.25832	279073	191.24	65.11588
Iceland	2000-Q2	70.22756	288517	188.17	68.41304
Iceland	2000-Q3	70.64897	293314	183	77.47352
Iceland	2000-Q4	71.49178	298536	174.16	83.47962
Iceland	2001-Q1	71.89212	314291	171.56	77.00172
Iceland	2001-Q2	74.16772	323161	150.08	72.29822
Iceland	2001-Q3	76.20007	336280	150.74	64.42305
Iceland	2001-Q4	77.40515	342904	146.12	51.7029
Iceland	2002-Q1	78.43093	361421	154.11	53.32751
Iceland	2002-Q2	78.68308	368268	162.73	62.74335
Iceland	2002-Q3	78.8323	385440	162.67	65.27137
Iceland	2002-Q4	79.2924	395228	165.87	68.73497
Iceland	2003-Q1	79.76785	407635	171.45	83.64521
Iceland	2003-Q2	80.32027	439506	170.86	73.31

Iceland	2003-Q3	80.36241	468998	164.04	74.8078
Iceland	2003-Q4	81.26844	464313	165.88	77.97722
Iceland	2004-Q1	81.47914	500320	170.57	85.41406
Iceland	2004-Q2	82.84871	510333	168.94	94.06901
Iceland	2004-Q3	83.22798	554670	169.32	102.9367
Iceland	2004-Q4	84.32364	533829	179.42	109.9186
Iceland	2005-Q1	85.04003	574857	189.63	114.9754
Iceland	2005-Q2	85.60893	616135	185	125.6224
Iceland	2005-Q3	86.49389	626469	192.77	149.9138
Iceland	2005-Q4	87.96881	657501	193.74	151.7998
Iceland	2006-Q1	88.70628	726744	174.87	148.562
Iceland	2006-Q2	91.63506	740103	156.89	160.0213
Iceland	2006-Q3	93.57935	739658	166.44	160.1574
Iceland	2006-Q4	94.26886	786185	163.08	144.0664
Iceland	2007-Q1	94.64812	834962	168.95	142.6794
Iceland	2007-Q2	95.8702	977101	178.1	158.9655
Iceland	2007-Q3	97.13443	1167682	170.26	169.3849
Iceland	2007-Q4	99.13611	1231465	168.4	201.078
Iceland	2008-Q1	101.4119	1401956	139.25	223.6517
Iceland	2008-Q2	107.6375	1383818	126.01	279.7467
Iceland	2008-Q3	110.7791	1427196	116.42	273.0155
Iceland	2008-Q4	116.0609	1626153	92.78	153.8137
Iceland	2009-Q1	118.7369	1569545	103.54	120.6482
Iceland	2009-Q2	120.458	1656159	87.63	135.3894
Iceland	2009-Q3	122.9729	1669340	85.89	148.9652
Iceland	2009-Q4	126.042	1608593	85.15	166.084
Iceland	2010-Q1	127.5778	1579829	87.21	175.9608
Iceland	2010-Q2	129.0649	1516161	92.94	176.2554
Iceland	2010-Q3	128.3282	1499424	96.59	171.6313
Iceland	2010-Q4	129.5863	1448967	96.3	190.2588
Iceland	2011-Q1	130.1382	1449761	92.49	219.5917
Iceland	2011-Q2	133.5531	1440356	90.61	241.9276
Iceland	2011-Q3	135.0736	1581364	92.47	233.3416
Iceland	2011-Q4	136.3798	1575226	92.36	231.1862
Iceland	2012-Q1	138.5077	1562251	87.58	242.8439
Iceland	2012-Q2	141.243	1482413	90.42	225.0866
Iceland	2012-Q3	140.8956	1477387	91.35	223.085
Iceland	2012-Q4	142.2504	1459100	87.6	221.4684
Iceland	2013-Q1	144.4994	1446695	89.83	227.321
Iceland	2013-Q2	145.9538	1494495	91.86	218.7575
Iceland	2013-Q3	146.5674	1534121	91.93	229.5335
Iceland	2013-Q4	147.6731	1524314	93.56	227.9075
Iceland	2014-Q1	148.0784	1540663	96.92	229.4645
Iceland	2014-Q2	149.3594	1547757	96.98	230.6925

Iceland	2014-Q3	149.6836	1602025	96.34	216.9077
Iceland	2014-Q4	149.527	1631855	96.34	172.218
Iceland	2015-Q1	149.6645	1720780	95.78	127.9972
Iceland	2015-Q2	151.6534	1768067	96.73	134.0564
Iceland	2015-Q3	152.6461	1783965	101.34	113.7305
Iceland	2015-Q4	152.428	1722792	102.29	100.1444
Iceland	2016-Q1	152.5682	1623637	103.7	81.02994
Iceland	2016-Q2	154.1141	1644610	105.95	100.2401
Iceland	2016-Q3	154.6452	1633883	114.54	103.2608
Iceland	2016-Q4	155.3546	1642936	123.55	115.4691
Iceland	2017-Q1	155.3648	1746155	125.23	123.0723
Iceland	2017-Q2	156.7952	1729747	130.57	113.8648
Iceland	2017-Q3	157.1923	1756048	118.85	118.1562
Iceland	2017-Q4	158.186	1725644	121.81	138.1095
Iceland	2018-Q1	159.1792	1756067	123.6	149.1056
Iceland	2018-Q2	160.392	1816410	121.1	159.2765
Iceland	2018-Q3	161.4228	1884621	119.13	166.749
Iceland	2018-Q4	163.3804	1846298	110.21	151.0079
Iceland	2019-Q1	164.1148	1912889	111.38	135.0537
Iceland	2019-Q2	165.8497	1933034	107.94	134.1393
Iceland	2019-Q3	166.3845	1888818	110.23	121.7694
Iceland	2019-Q4	167.4468	1888892	111.42	126.1776
Iceland	2020-Q1	167.5441	2007442	103.23	102.8085
Iceland	2020-Q2	169.9926	2053942	100.98	68.76653
Iceland	2020-Q3	171.7787	2137932	95.86	90.31376
Iceland	2020-Q4	173.3847	2109670	100.45	104.9307
Iceland	2021-Q1	174.63	2133928	101.9	139.4159
Iceland	2021-Q2	177.4928	2222003	105.31	156.2154
Iceland	2021-Q3	179.157	2321380	102	192.6785
Iceland	2021-Q4	181.7612	2340190	104.33	244.045
Iceland	2022-Q1	185.4247	2384004	106.74	277.7365
Iceland	2022-Q2	191.4818	2452948	110.43	311.7772
Iceland	2022-Q3	196.4758	2516402	108.43	350.1239
Iceland	2022-Q4	198.9036	2548527	102.79	258.4067
Iceland	2023-Q1	203.9336	2598181	104.19	203.6714
Iceland	2023-Q2	209.4928	2667682	105.87	175.8058
Iceland	2023-Q3	211.739	2779329	110.08	189.2505
Iceland	2023-Q4	214.5897	2760579	105.37	189.2923
Sweden	2000-Q1	259.0467	1171981	108.24	65.11588
Sweden	2000-Q2	260.86	1162429	109.4	68.41304
Sweden	2000-Q3	260.7333	1167693	104.99	77.47352
Sweden	2000-Q4	262.6033	1164008	103.75	83.47962
Sweden	2001-Q1	262.98	1153409	100.07	77.00172
Sweden	2001-Q2	267.9667	1207078	97.05	72.29822

Sweden	2001-Q3	268.13	1231473	94.85	64.42305
Sweden	2001-Q4	269.2667	1164592	96.77	51.7029
Sweden	2002-Q1	270.0033	1178417	100.21	53.32751
Sweden	2002-Q2	273.2733	1199039	102.16	62.74335
Sweden	2002-Q3	273.0667	1249366	102.49	65.27137
Sweden	2002-Q4	275.06	1262172	104.48	68.73497
Sweden	2003-Q1	278.0633	1262267	105.75	83.64521
Sweden	2003-Q2	278.3633	1242834	109.39	73.31
Sweden	2003-Q3	277.3967	1282800	108.53	74.8078
Sweden	2003-Q4	278.5967	1307593	111.84	77.97722
Sweden	2004-Q1	278.21	1269561	108.89	85.41406
Sweden	2004-Q2	279.4933	1253884	109.61	94.06901
Sweden	2004-Q3	278.9467	1329793	110.52	102.9367
Sweden	2004-Q4	279.9267	1360279	113.86	109.9186
Sweden	2005-Q1	278.9467	1345842	111.67	114.9754
Sweden	2005-Q2	280.32	1416856	106.86	125.6224
Sweden	2005-Q3	280.41	1442514	106.07	149.9138
Sweden	2005-Q4	281.96	1533038	104.32	151.7998
Sweden	2006-Q1	281.1267	1539448	104.89	148.562
Sweden	2006-Q2	284.5867	1653888	108.5	160.0213
Sweden	2006-Q3	284.87	1708882	108.28	160.1574
Sweden	2006-Q4	286.31	1762550	111.55	144.0664
Sweden	2007-Q1	286.5967	1781949	108.51	142.6794
Sweden	2007-Q2	289.74	1867760	108.11	158.9655
Sweden	2007-Q3	290.4	1984698	109.25	169.3849
Sweden	2007-Q4	295.3067	2089485	108.74	201.078
Sweden	2008-Q1	295.8733	2030426	110.76	223.6517
Sweden	2008-Q2	300.7333	2051509	111.16	279.7467
Sweden	2008-Q3	302.84	2060333	107.21	273.0155
Sweden	2008-Q4	302.5367	2164492	96.83	153.8137
Sweden	2009-Q1	298.21	2097672	93.46	120.6482
Sweden	2009-Q2	298.9867	2096402	96.42	135.3894
Sweden	2009-Q3	298.55	2073889	103.14	148.9652
Sweden	2009-Q4	300.2933	2135298	100.78	166.084
Sweden	2010-Q1	300.25	2121598	104.76	175.9608
Sweden	2010-Q2	301.76	2125772	103.02	176.2554
Sweden	2010-Q3	301.91	2159185	108.11	171.6313
Sweden	2010-Q4	305.97	2188006	110.23	190.2588
Sweden	2011-Q1	308.0933	2172324	113.93	219.5917
Sweden	2011-Q2	311.58	2209010	111.62	241.9276
Sweden	2011-Q3	311.9233	2284103	110.55	233.3416
Sweden	2011-Q4	314.12	2339371	111.04	231.1862
Sweden	2012-Q1	313.5233	2374874	111.71	242.8439
Sweden	2012-Q2	315.0567	2346213	110.81	225.0866

Sweden	2012-Q3	313.8633	2390875	115.83	223.085
Sweden	2012-Q4	314.34	2412372	114.47	221.4684
Sweden	2013-Q1	313.3467	2397290	119.32	227.321
Sweden	2013-Q2	314.1867	2449436	116.12	218.7575
Sweden	2013-Q3	314.1467	2422066	117.08	229.5335
Sweden	2013-Q4	314.5467	2487778	114.78	227.9075
Sweden	2014-Q1	312.2567	2466666	116.75	229.4645
Sweden	2014-Q2	314.2133	2557125	112.68	230.6925
Sweden	2014-Q3	313.6233	2553883	109.96	216.9077
Sweden	2014-Q4	313.8767	2589790	107.73	172.218
Sweden	2015-Q1	312.29	2616459	105.18	127.9972
Sweden	2015-Q2	313.5767	2718829	106.03	134.0564
Sweden	2015-Q3	313.4333	2715715	106.48	113.7305
Sweden	2015-Q4	314.0833	2787814	107.55	100.1444
Sweden	2016-Q1	314.3233	2846216	107.96	81.02994
Sweden	2016-Q2	316.13	2903905	107.68	100.2401
Sweden	2016-Q3	316.6733	2955449	105.2	103.2608
Sweden	2016-Q4	318.5933	2997943	102.86	115.4691
Sweden	2017-Q1	318.97	3142133	104.78	123.0723
Sweden	2017-Q2	321.75	3229497	103.77	113.8648
Sweden	2017-Q3	323.4967	3256637	107.72	118.1562
Sweden	2017-Q4	324.2167	3242547	103.57	138.1095
Sweden	2018-Q1	324.38	3344454	101.65	149.1056
Sweden	2018-Q2	327.86	3408270	99.94	159.2765
Sweden	2018-Q3	330.3667	3406311	99.84	166.749
Sweden	2018-Q4	330.9967	3432832	100.6	151.0079
Sweden	2019-Q1	330.4567	3506802	97.65	135.0537
Sweden	2019-Q2	334.51	3608433	96.99	134.1393
Sweden	2019-Q3	335.38	3670791	96.16	121.7694
Sweden	2019-Q4	336.6933	3702972	97.92	126.1776
Sweden	2020-Q1	333.7333	3953802	95.99	102.8085
Sweden	2020-Q2	334.8833	4168527	99.95	68.76653
Sweden	2020-Q3	337.3033	4194349	101.79	90.31376
Sweden	2020-Q4	337.77	4361253	104.41	104.9307
Sweden	2021-Q1	338.88	4504150	103.57	139.4159
Sweden	2021-Q2	340.91	4673288	104.17	156.2154
Sweden	2021-Q3	343.9867	4764850	103.2	192.6785
Sweden	2021-Q4	348.98	4826810	101.6	244.045
Sweden	2022-Q1	354.64	4958495	98.53	277.7365
Sweden	2022-Q2	366.2633	5078210	97.7	311.7772
Sweden	2022-Q3	377.4333	5022835	95.31	350.1239
Sweden	2022-Q4	389.31	4955451	95.32	258.4067
Sweden	2023-Q1	395.1333	4849194	93.95	203.6714
Sweden	2023-Q2	402.2033	4875388	91.26	175.8058

Sweden	2023-Q3	406.5633	4810689	90.49	189.2505
Sweden	2023-Q4	410.92	4887832	95.86	189.2923
Norway	2000-Q1	74.73333	695398.3	116.88	65.11588
Norway	2000-Q2	75.3	711039.3	114.89	68.41304
Norway	2000-Q3	75.53333	737412	115.33	77.47352
Norway	2000-Q4	76.23333	745011.3	116	83.47962
Norway	2001-Q1	77.36667	775066	118.13	77.00172
Norway	2001-Q2	78.26667	780980	119.4	72.29822
Norway	2001-Q3	77.46667	799276	121.8	64.42305
Norway	2001-Q4	77.76667	808141	121.09	51.7029
Norway	2002-Q1	78.16667	840517.3	124.17	53.32751
Norway	2002-Q2	78.63333	844060.7	132.64	62.74335
Norway	2002-Q3	78.56667	855674	134.5	65.27137
Norway	2002-Q4	79.5	870594.3	137.07	68.73497
Norway	2003-Q1	81.76667	888272.3	130.44	83.64521
Norway	2003-Q2	80.4	886196.3	127.52	73.31
Norway	2003-Q3	80.06667	896661	125.36	74.8078
Norway	2003-Q4	80.46667	897625.7	127.34	77.97722
Norway	2004-Q1	80.6	913801.3	122.72	85.41406
Norway	2004-Q2	81.06667	930800.3	126	94.06901
Norway	2004-Q3	81.03333	939391	125.06	102.9367
Norway	2004-Q4	81.46667	960420	129.01	109.9186
Norway	2005-Q1	81.4	989392.7	128.81	114.9754
Norway	2005-Q2	82.3	1015704	131.08	125.6224
Norway	2005-Q3	82.46667	1045202	132.77	149.9138
Norway	2005-Q4	82.96667	1068293	129.37	151.7998
Norway	2006-Q1	83.23333	1094170	129.49	148.562
Norway	2006-Q2	84.26667	1130090	133.1	160.0213
Norway	2006-Q3	84.3	1166245	126.59	160.1574
Norway	2006-Q4	85	1203003	128.34	144.0664
Norway	2007-Q1	84.06667	1263899	129.35	142.6794
Norway	2007-Q2	84.53333	1308729	130.69	158.9655
Norway	2007-Q3	84.43333	1365461	135.26	169.3849
Norway	2007-Q4	86.16667	1403369	133.82	201.078
Norway	2008-Q1	87.03333	1355600	136.73	223.6517
Norway	2008-Q2	87.26667	1364232	136.6	279.7467
Norway	2008-Q3	88.4	1380705	131.73	273.0155
Norway	2008-Q4	89.23333	1403727	116.44	153.8137
Norway	2009-Q1	89.16667	1414734	125.38	120.6482
Norway	2009-Q2	90	1421998	124.15	135.3894
Norway	2009-Q3	90	1422121	128.84	148.9652
Norway	2009-Q4	90.5	1417723	131.84	166.084
Norway	2010-Q1	91.8	1425791	132.81	175.9608
Norway	2010-Q2	92.33333	1435282	130.21	176.2554

Norway	2010-Q3	91.66667	1472332	131.06	171.6313
Norway	2010-Q4	92.56667	1505171	131.08	190.2588
Norway	2011-Q1	93.06667	1539229	134.02	219.5917
Norway	2011-Q2	93.66667	1561308	135.11	241.9276
Norway	2011-Q3	93.03333	1584807	135.75	233.3416
Norway	2011-Q4	93.33333	1614443	133.75	231.1862
Norway	2012-Q1	93.83333	1636814	136.42	242.8439
Norway	2012-Q2	94.03333	1642174	134.58	225.0866
Norway	2012-Q3	93.36667	1671052	136.65	223.085
Norway	2012-Q4	94.46667	1689021	138.73	221.4684
Norway	2013-Q1	95	1704042	136.31	227.321
Norway	2013-Q2	95.86667	1722819	133.83	218.7575
Norway	2013-Q3	96.16667	1757430	130.49	229.5335
Norway	2013-Q4	96.63333	1778708	125.43	227.9075
Norway	2014-Q1	97	1813292	127.94	229.4645
Norway	2014-Q2	97.66667	1840671	128.01	230.6925
Norway	2014-Q3	98.23333	1872292	126.63	216.9077
Norway	2014-Q4	98.6	1895108	115.29	172.218
Norway	2015-Q1	98.9	1929111	114.05	127.9972
Norway	2015-Q2	99.83333	1885493	114.02	134.0564
Norway	2015-Q3	100.2	1911601	109.06	113.7305
Norway	2015-Q4	101.0667	1922110	106.07	100.1444
Norway	2016-Q1	102.0333	1938315	107.61	81.02994
Norway	2016-Q2	103.3	1968534	109.29	100.2401
Norway	2016-Q3	104.2	2017774	111.33	103.2608
Norway	2016-Q4	104.6667	2032441	112.82	115.4691
Norway	2017-Q1	104.6667	2064653	111.79	123.0723
Norway	2017-Q2	105.4667	2103836	108.77	113.8648
Norway	2017-Q3	105.7667	2141616	112.32	118.1562
Norway	2017-Q4	106.0667	2157826	106.74	138.1095
Norway	2018-Q1	106.7667	2182966	110.56	149.1056
Norway	2018-Q2	108	2240977	111.17	159.2765
Norway	2018-Q3	109.2333	2264659	111.34	166.749
Norway	2018-Q4	109.6333	2260281	107.86	151.0079
Norway	2019-Q1	109.9667	2279670	108.34	135.0537
Norway	2019-Q2	110.6333	2317740	108.9	134.1393
Norway	2019-Q3	111.0333	2372610	106.74	121.7694
Norway	2019-Q4	111.4	2361448	105	126.1776
Norway	2020-Q1	111.2333	2411830	94.64	102.8085
Norway	2020-Q2	111.9	2554970	99.9	68.76653
Norway	2020-Q3	112.7667	2614444	100.6	90.31376
Norway	2020-Q4	112.8333	2644051	101.98	104.9307
Norway	2021-Q1	114.5333	2705435	105.77	139.4159
Norway	2021-Q2	115.0667	2803821	105.85	156.2154

Norway	2021-Q3	116.7	2888050	105.07	192.6785
Norway	2021-Q4	118.0667	2904629	104.92	244.045
Norway	2022-Q1	118.9	2967466	109.16	277.7365
Norway	2022-Q2	121.7667	3049576	102.83	311.7772
Norway	2022-Q3	124.5667	3127018	103.65	350.1239
Norway	2022-Q4	125.9	3088067	102.97	258.4067
Norway	2023-Q1	126.7667	3132817	95.98	203.6714
Norway	2023-Q2	129.6667	3105646	93.8	175.8058
Norway	2023-Q3	130.2	3098135	96.68	189.2505
Norway	2023-Q4	131.6	3101977	95.56	189.2923

Appendix 23

Do-file for ARDL

```
*------------------------
*FOR SETTING UP FROM EXCEL UNDIFFERENCED VARIABLES
gen date = quarterly(quarter, "YQ")

foreach v of var * {
	drop if missing(`v')
}

foreach v of var * {
	gen l`v' = ln(`v')
}

*------------------------
*FOR SERIAL CORRELATION TESTING ALL UNDIFFERENCED VARIABLES

foreach v of varlist lcpi lm lxr lgep {
	display "`v'"
	display "Lags: 0"
	quietly regress D.`v' L.`v' trend
	estat bgodfrey, lags(1/4) nomiss0
	forvalues lags = 1/5 {
		display "Lags: `lags'"
		quietly regress D.`v' L(1/`lags')D.`v' L.`v' trend
		estat bgodfrey, lags(1/4) nomiss0
	}
	display "*-----------------*"
}

foreach v of varlist D.lcpi {
	display "`v'"
	display "Lags: 0"
	quietly regress D.`v' L.`v' trend
	estat bgodfrey, lags(1/4) nomiss0
	forvalues lags = 1/5 {
		display "Lags: `lags'"
		quietly regress D.`v' L(1/`lags')D.`v' L.`v' trend
		estat bgodfrey, lags(1/4) nomiss0
	}
	display "*-----------------*"
}

*------------------------
*FOR ARDL TESTING ALL UNDIFFERENCED VARIABLES

forvalues cpilags = 1/2 {
	forvalues mlags = 0/2 {
		forvalues xrlags = 0/2 {
			forvalues geplags = 0/2 {

				eststo: regress lcpi L(1/`cpilags').lcpi L(0/`mlags').lm L(0/`xrlags').lxr
L(0/`geplags').lgep

			}
		}
	}
}
esttab, scalars (aic bic) noobs

*------------------------
*FOR ARDL TESTING ALL DIFFERENCED VARIABLES

eststo clear
forvalues cpilags = 1/2 {
	forvalues mlags = 0/2 {
		forvalues xrlags = 0/2 {
			forvalues geplags = 0/2 {
```

```
                                          eststo: quietly regress Dlcpi L(1/`cpilags').Dlcpi L(0/`mlags').Dlm L(0/`xrlags').Dlxr
L(0/`geplags').Dlgep, robust
                                }
                      }
           }
}
esttab using test2.csv, replace scalars (aic bic) se

*------------------------
*FOR ARDL TESTING FINAL SPECIFICATION

eststo clear
forvalues cpilags = 1/2 {
           forvalues mlags = 0/2 {
                      forvalues xrlags = 0/2 {
                                forvalues geplags = 0/2 {
                                          eststo: quietly regress Dlcpi L(1/`cpilags').Dlcpi L(0/`mlags').lm L(0/`xrlags').lxr
L(0/`geplags').lgep, robust
                                }
                      }
           }
}
esttab using ardlspec.csv, replace scalars (aic bic) se

*------------------------
*FOR SERIAL CORRELATION TESTING DIFFERENT ARDL SPECIFICATIONS

forvalues lags = 1/5 {
           display "AR lags: `lags'"
           eststo: quietly regress Dlcpi L(1/`lags').Dlcpi L(0/1).lm lxr L(0/1).lxr
           estat bgodfrey, lags(1/5)
}

*------------------------
*FOR DETRENDING ALL VARIABLES

foreach v of varlist lcpi lm lxr lgep {
           quietly reg `v' date
           predict t`v', resid
}
```

Appendix 24

Do-file for Panel Data estimation

```
*Initial set-up
foreach v of varlist cpi m xr gep {
           gen l`v' = ln(`v')
           label variable l`v' "LN of `v'"
}

foreach v of varlist lcpi lm lxr lgep {
           *needed because Breusch Pagan test breaks if using D. operator
           gen d`v' = D.`v'
           label variable d`v' "Lag of `v'"
}

gen date = quarterly(year, "YQ")
format date %tq
gen trend = _n

xtset countryID date

*Breusch Pagan test: RE vs OLS
reg dlcpi lm lxr lgep
xtreg dlcpi lm lxr lgep, re
xttest0

*F-test: FE vs OLS
xtreg dlcpi lm lxr lgep, fe
           *Automatically performs the F-test at the bottom

*Hausman test: FE vs RE
eststo fixed: qui xtreg dlcpi lm lxr lgep, fe
xtreg dlcpi lm lxr lgep, re
hausman fixed

*note: I think random effects win
xtreg dlcpi lm lxr lgep, re robust
```

Appendix 25

Do-file for logistic regression

```
gen inf = lcpi - l4.lcpi

drop it

gen it = 0

replace it = 1 if rinf < 0.02
```

```
probit it lm lgep
estat class
margins, dydx(*)
          *Tells the the AVERAGE MARGINAL EFFECTS
margins, dydx(*) atmeans
          *Tells us the MARGINAL EFFECTS AT MEAN

logistic it lm lgep
estat class
margins, dydx(*)
          *Tells the the AVERAGE MARGINAL EFFECTS
margins, dydx(*) atmeans
          *Tells us the MARGINAL EFFECTS AT MEAN
```