

# UNIVERSITÄT OSNABRÜCK

## FACHBEREICH WIRTSCHAFTSWISSENSCHAFTEN

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### Cover page (Klausurdeckblatt)

<b>Exam in subject</b> (Prüfung im Fach)	Empirical Economic Policy
<b>Examiner</b> (Prüfer)	Prof. Frank Westermann, Ph.D.
<b>Date</b> (Datum)	16.02.2023

### Participant (Klausurteilnehmer/in)

<b>Course of studies</b> (Studiengang)	
<b>Surname, given name</b> (Name, Vorname)	
<b>Matriculation number</b> (Matrikel-Nr.)	

### Gained points Erreichte Punkte

\* All tasks are to be processed \*  
(Es sind alle Aufgaben zu bearbeiten)

<b>Points</b> (Punkte)			
<b>A1</b>	<b>A2</b>	<b>A3</b>	<b>A4</b>

### Grading (Benotung)

<b>Total score</b> (Gesamtpunktzahl)	
<b>Grade</b> (Modulnote)	
<b>Examiner signature</b> (Prüferunterschrift)	



Fachgebiet Internationale Wirtschaftspolitik  
Prof. Frank Westermann, Ph.D.

## Exam “Empirical Economic Policy“

Winter term 2022/23

Total points: 60 points

**For all questions: Please label all graphs and provide definitions for all variables (graphs and formulas)!**

**Please also use the reverse side for the solution!**

### **Question 1: GDP-Forecast (14 points)**

You are asked to forecast GDP based on the Box-Jenkins approach.

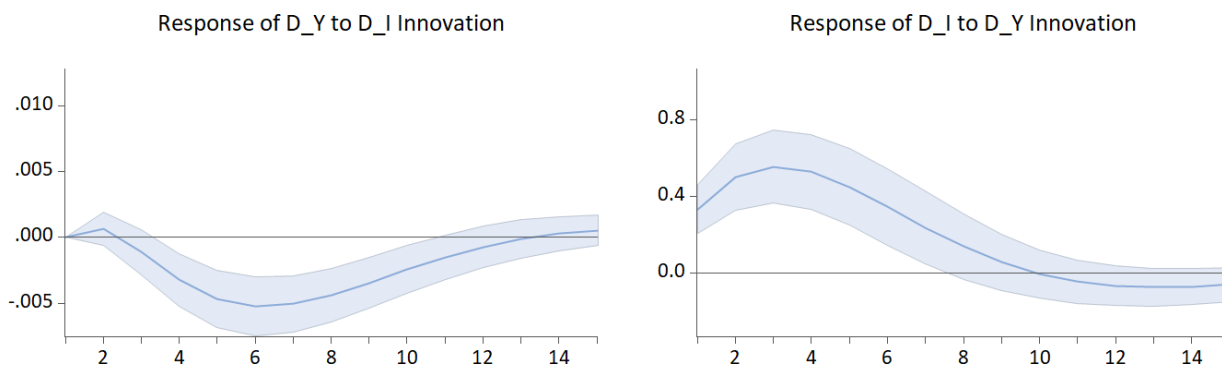
- a) Define formally two stochastic processes, a moving-average and an autoregressive process. In addition, describe verbally the characteristics of the autocorrelation and partial autocorrelation functions. (6 points)

- b) State verbally the relationship between the two time series processes. Under which assumption can the two processes be inverted? Explain your answer. (4 points).

- c) Criticize the Box-Jenkins approach to forecasting by explaining two possible weaknesses. (4 points)

**Question 2: Monetary policy (15 points)**

- a) The following output shows impulse response functions for GDP growth ( $D_Y$ ) and the change in interest rates ( $D_I$ ) in quarterly values. Interpret the result in the context of monetary policy. Also address the point estimate and significance. (6 points)



- b) Explain the problem of contemporaneous correlation that may arise in the interpretation of impulse-response functions. (5 points)

- c) What are the strengths of impulse response functions compared to the Granger test? Name and explain two. (4 points)

**Question 3: Long-term economic policy (15 points)**

- a) Define formally two different types of convergence (4 points)

- b) The following outputs are part of the Engle-Granger two-stage procedure. Using the outputs, illustrate the procedure, state the regression equations, and interpret the result. AUT is the GDP of Austria and NLD is the GDP of the Netherlands. (8 points)

Dependent Variable: AUT  
Method: Least Squares

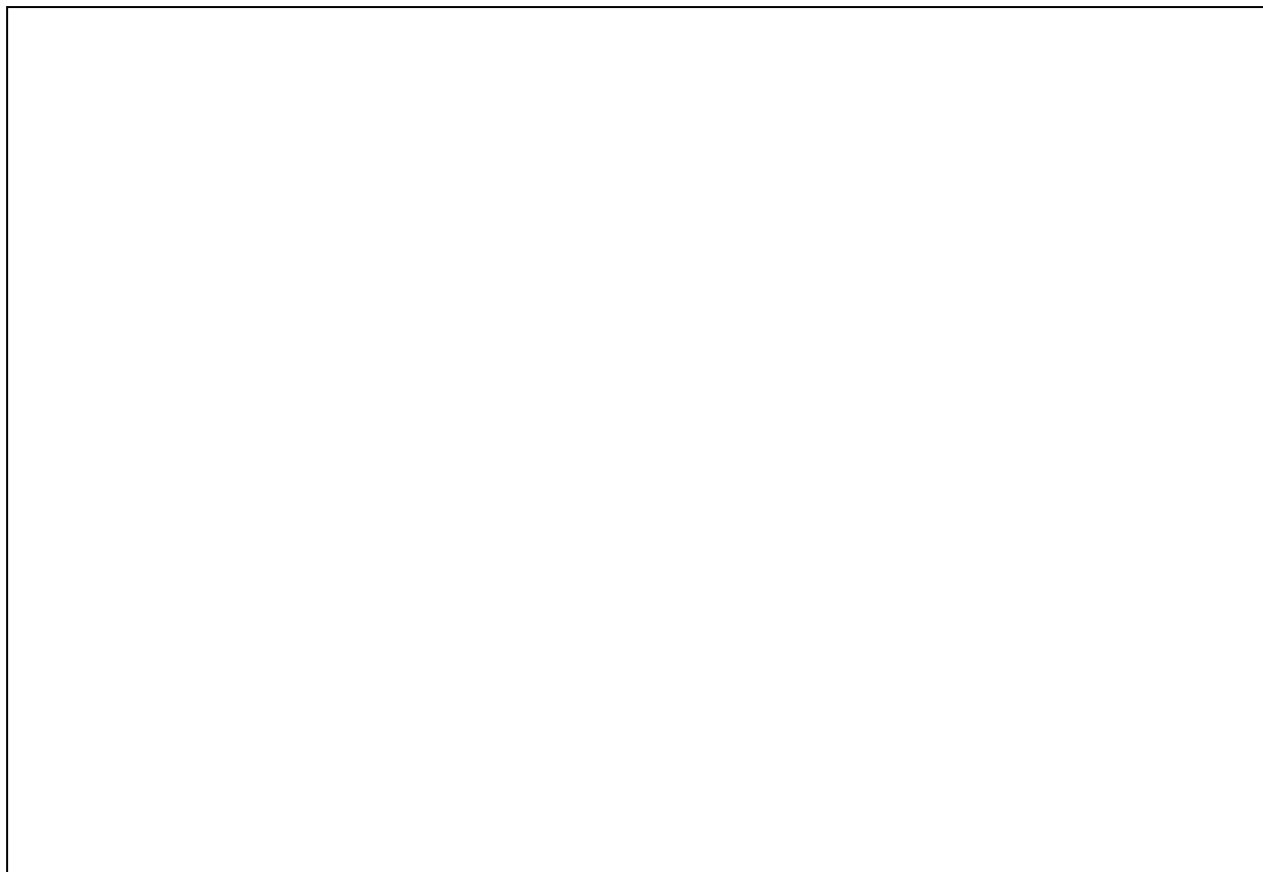
Sample (adjusted): 1996Q1 2022Q3  
Included observations: 107 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NLD	0.974122	0.003100	314.2738	0.0000
R-squared	0.939575	Mean dependent var	90.47892	
Adjusted R-squared	0.939575	S.D. dependent var	12.21737	
S.E. of regression	3.003209	Akaike info criterion	5.046541	
Sum squared resid	956.0418	Schwarz criterion	5.071521	
Log likelihood	-268.9900	Hannan-Quinn criter.	5.056668	
Durbin-Watson stat	0.044714			

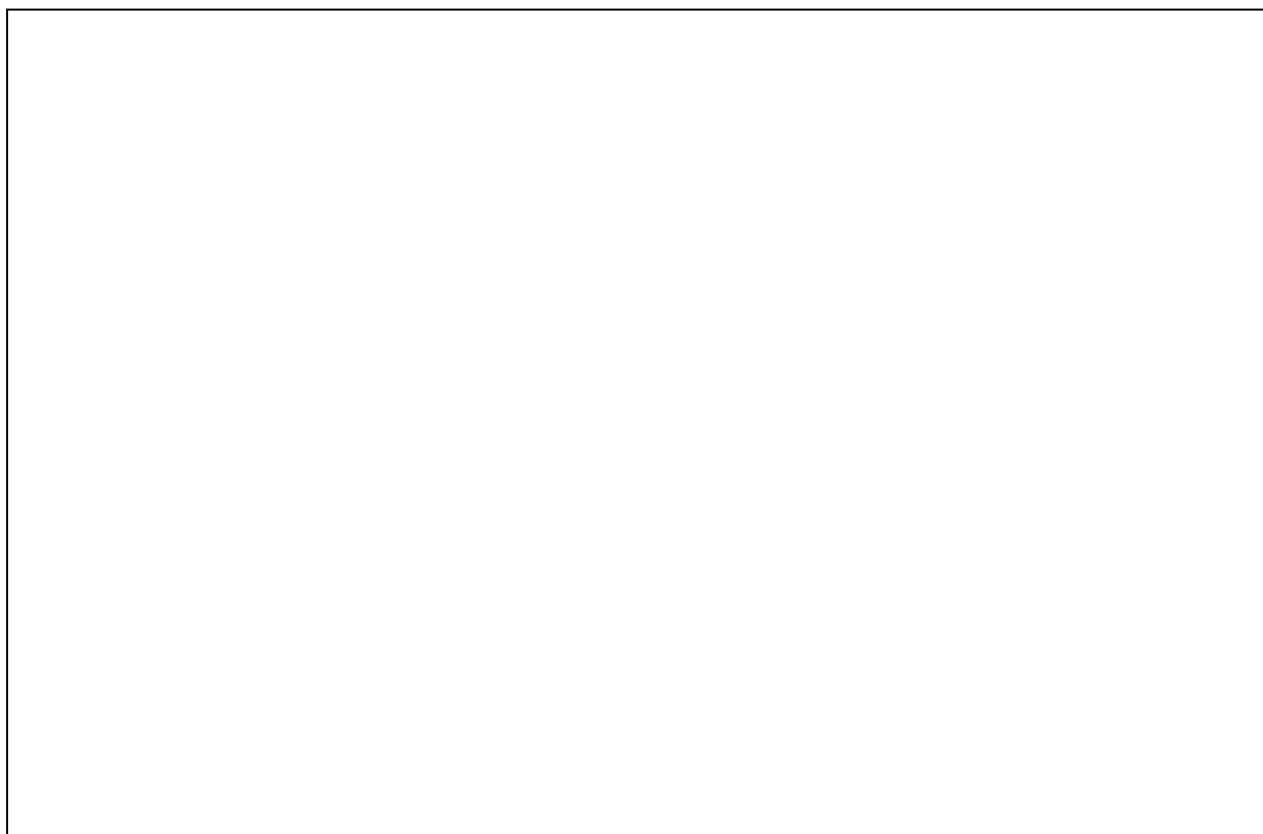
Null Hypothesis: E has a unit root  
Exogenous: Constant  
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.443348	0.5583
Test critical values:		
1% level	-3.493129	
5% level	-2.888932	
10% level	-2.581453	

\*MacKinnon (1996) one-sided p-values.

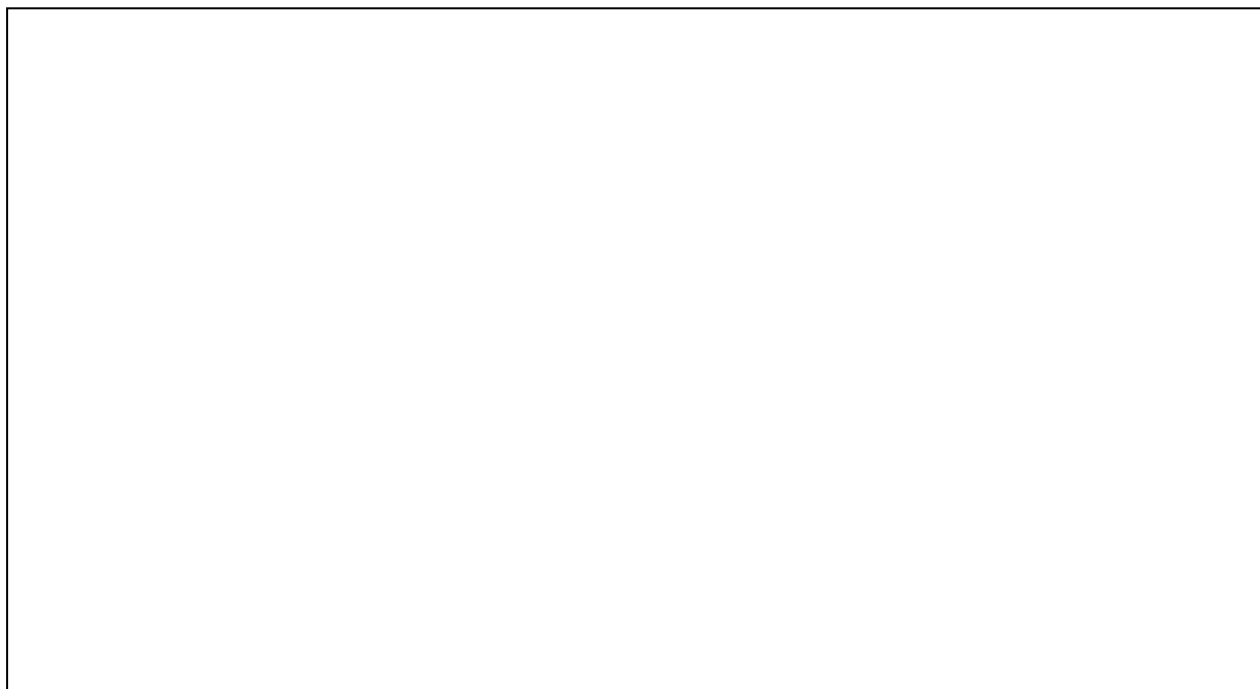


- c) Which definition of convergence does the test from b) correspond to? Name an alternative testing procedure and state one criticism for this alternative procedure. (3 points)

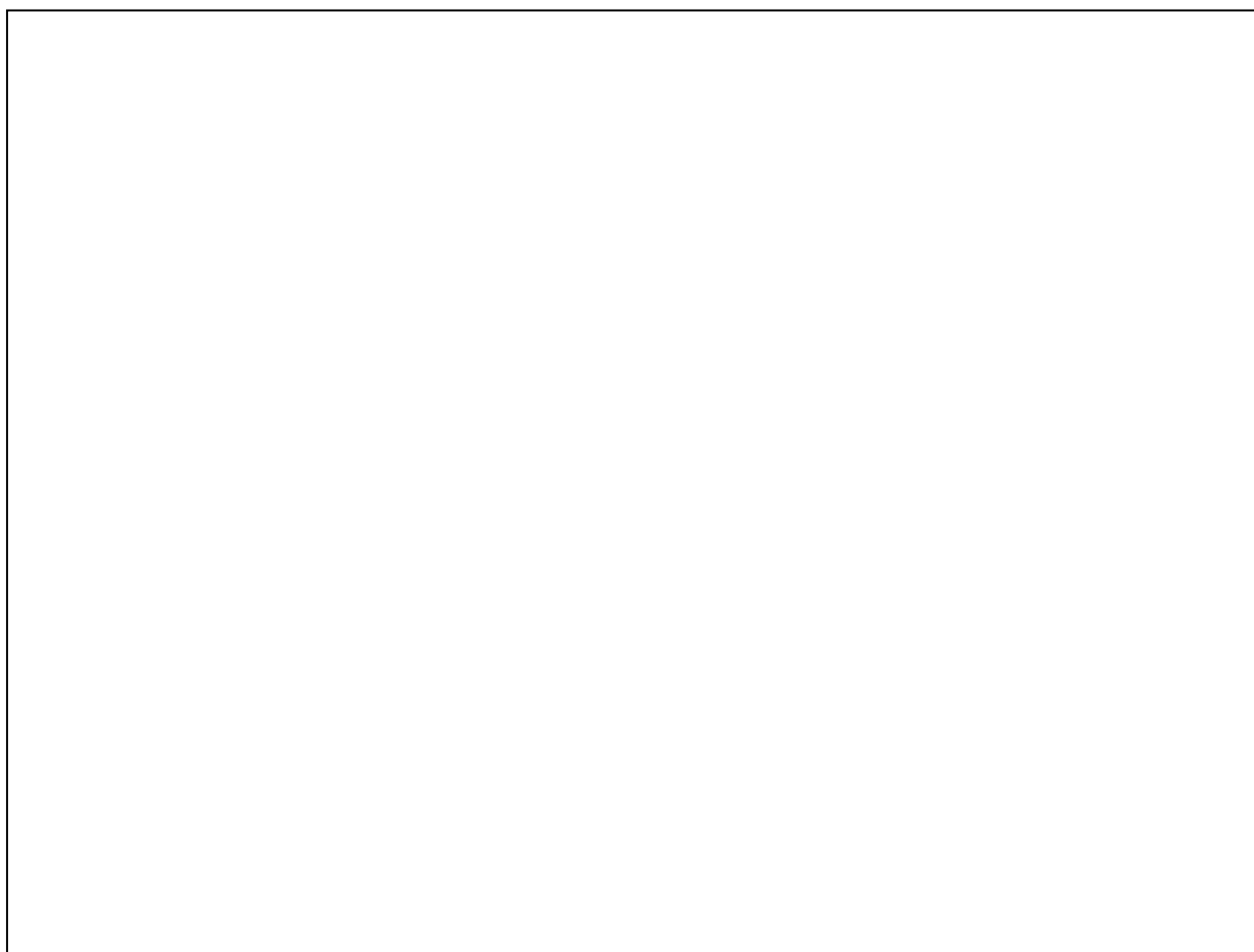


**Question 4: Public debt (16 points)**

- a) Verbally state the definition of sustainable public finance. (3 points)



- b) Sketch the condition for fulfillment of the transversality condition in an appropriate graph. (Fully label all components.) Explain your graph. (4 points)





- c) Formally state the transversality condition and verbally explain why it can be verified using the unit root test. (5 points)

- d) Name and explain two criticisms of the unit-root test procedure. (4 points)

**The Chair of International Economic Policy wishes you best success!**

Please sign the exam on the last page before handing it in.