DUAL ADJUSTMENT SOFTWARE (das)

USER GUIDE

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@April 2021 - DAS Version 3.01

# The Aim

- Dual Adjustment Software (DAS) is a program created to analyse the dual movements of time series variables in line with the dual adjustment approach [see İsmihan (2019) and İsmihan and Küçüker (2019) for more detail].
- In this guide, we will show how to use DAS program with EViews software to do dual adjustment analysis.

### **Application: US consumption function**

- **Pcedpi2919.wf1** contains annual data from 1929 to 2019.
- The data are from FRED II.
- pce Real Personal Consumption Expenditures (in billions of chained 2012 dollars).
- **dpi** -Real Personal Disposable Income (in billions of chained 2012 dollars).

Workfile: PCEDPI2919 - (c:\users\mcank\desktop\pcedpi2919.wf1)	
View Proc Object Save Snapshot Freeze Details+/- Show Fetch Store Delete Genr Samp	le
Range: 1929 2019 91 obs	Filter: *
Sample: 1929 2019 91 obs	Order: Name
pce	
< > Untitled / New Page	

## To open DAS in Eviews;

- Click File > Open> Programs...
- When you select the «Programs...» menu, you will see a standard Windows file dialog. Navigate to your download directory and double click on the «dualadj3encr.prg».
- You may also drag the **dualadj3.encr.prg** file onto the Eviews window to open it.
- After this step, the program window will open.

EViews				
e Edit Object View Proc Quick Op	tions Ac	ld-ins Windo	w Help	
New	+			
Open 2	•	EViews V	Vorkfile	Ctrl+O
Save	Ctrl+S	Foreign	Data as Work	dile
Save As		Database	2	
Close		Program	s 3	
Import	•	Program	s in Add-ins	folder
Export	•	Text File.		
	<b>C L D</b>			
Print	Ctrl+P			
Print Setup				
Run	F10			
Exit				
0 c:\users\mcank\desktop\dualadj3encr.pr	g			
1 c:\users\mcank\desktop\pcedpi2919.wf1				
2 c:\users\mcank\desktop\dualadj3.prg				
3 c:\users\mcank\appda\usconnew.wf1				
4 e:\can\dual three stages investment2.w	f1			
5 c:\users\mcank\des\kahve talebi.xlsx				
6 e:\desktop 26 ağusto\veri8haziran.wf1				
7 e:\desktop 26 ağu\veri14 nisan2020.wf1				
8 nelsonplosser.wf1				
9 e:\desktop 26 ağ\veri14 nisan2020 2.wf	1			

- **To run the DAS**, click the «Run» button on the Program window.
- After this step the run dialog will open.



- Run dialog contains some program execution options. You can choose to ignore them or you can select the «Quiet» option for iteration speed.
- Click the «OK» button. After this step the DAS user interface will open.

Workfile: PCEDPI2919 - (c:\users\m View Proc Object Save Snapshot F Range: 1929 2019 91 obs Sample: 1929 2019 91 obs	Program: DUALADJ3ENCR - (c:\users\mcank\desktop\dualadj   Run Print Save SaveAs Snapshot Cut Copy Paste InsertTxt Find Replace Wrap Encrypted program
E c ☆ dpi ☆ pce ☆ resid	Run Program       ×         Program name or path       C:/USERS/WCANK/DESKTOP         VDUAL ADJSENCR.PRG          Program arguments (%0 %1)       OK         Runtime errors       OK         Quiet (fast) no screen/status line       Cancel         Quiet (fast) no screen/status line updates       Cancel         Nersion 4 compatible variable substitution and program boolean comparisons       1
Intitled New Page	Save options as default

- The user interface has six main parts.
- 1- Dependent Variable Box: Type the dependent variable.
- 2- Regressors Boxes: Type the independent variable/variables.
- 3- Constant Term Check Box: Uncheck the box for models with no constant term.
- 4- Filtering Method List Box: Choose the filtering method (HP, BK or CF).
- 5- Smoothing Parameter Box: Type the smoothing parameter value for Hodrick-Prescott filtering method.
- 6- Fragility Analysis: You can run the fragility analysis on this part of the interface. Check the box and enter the number of observation in the text box.
- Simply click the «OK» button to run the program. The result table will open.

Workfile: PCEDPI2919 - (c:\users\m View Proc Object Save Snapshot Fr Range: 1929 2019 - 91 obs Sample: 1929 2019 - 91 obs C c	Program: DUALADJ3ENCR - (c:\users\ Run Print Save SaveAs Snapshot Cu Encrypted program Dual Adjustment	mcank\desktop\duala   Copy Paste InsertTxt Find Replace Wrap+
v pce v resid ⊡ yontem	Dependent Variable 1 pce	Sixth Independent Variable 2
	First Independent Variable 2	Constant Term 3
	Second Independent Variable	Filtering Method 4
		Hodrick-Prescott
	Third Independent Variable	100
	Fourth Independent Variable	Fragility Analysis 6 Number of Observation for Fragility Analysis
	Fifth Independent Variable	10
	ОК	Cancel
Vntitled New Page		

- The **Dual Adjustment Analysis output** (results) are divided into four distinct sections.
- 1- The first portion provides information about the analysis.
- **Dependent Variable:** Denotes the dependent variable (pce in this example)
- **Filtering Method:** Denotes the filtering method (Hodrick-Prescott in this example)
- Lambda Value: Denotes the smoothing parameter for H-P (HP) Filter (100 in this example)
- **Sample:** Shows the sample period over which the analysis is carried out (1929-2019 in this example)
- Included Observations: Shows the number of observations included in analysis.
- 2- The second portion provides information about dual adjustment (cotrending) **test results** and estimated coefficients.
- According to the co-trending test results, we can reject the null hypothesis of no co-trending at %1 level. The evidence clearly suggest that pce and dpi are cotrended.
- Trend analysis part of this section provides information about estimated coefficients of permanent components (Engle-Yoo[EY] and OLS for the sake of comparison) and corresponding standard errors (se). Gap analysis part shows the relevant info for transitory (gap)components (Newey-West [NW] standard errors are used)
- 3- The third portion provides information about **traditional (Engle-Granger** [EG]) co-integration test results and estimates coefficients (with EY & OLS). According to test results, pce and dpi are not co-integrated in this example.
- 4- The fourth section provides output on **information criteria** and **t-test** results for dual adjustment. According to first t-test result, coefficients of permanent and transitory components of dpi are not equal. According to the second t-test, which is used as a confirmation of the first t-test, coefficients of the permanent and transitory components of dpi are equal. Therefore, in this example with lambda=100, the evidence on dual adjustment is inconclusive.

	Ie: IABLESON Workfile: PCEDPI	2919::Untitled					
ew	Proc Object Print Name Edit	+/- CellFmt Grid+/- 1	Title Commer	nts+/-			
	A	B	С	D	E	F	
1	Dependent Variable: pce						
2	Filtering Method: Hodrick-Pres	scott			1		
3	Lambda Value: 100						
4	Sample: 1929 2019						
5	Included observations: 91						
6							
7	Co-Trending Test						
8	t:	-4.173942			2		
9	p:	0.006400			2		
10							
11	Trend Analysis						
12	Permanent Component	Coefficient (EY)	se (EY)	t	Coefficient (OLS)		
13	C	-89.81065	10.42458	-8.615278	-90.06469		
14	dpi	0.906020	0.008183	110.7198	0.905770		
15							
16	Gap Analysis						
1/	Transitory Component	Coefficient (OLS)	se (NW)	t	p		
18	apı	0.821094	0.105912	7.752621	0.000000		
20	Co. Integration Test (EC)						
20	Co-Integration Test (EG)	0.064600					
20 21	Co-Integration Test (EG) t:	-2.864688			3		
20 21 22	Co-Integration Test (EG) t: p:	-2.864688 0.156300			3		
20 21 22 23	Co-Integration Test (EG) t: p:	-2.864688 0.156300			3		
20 21 22 23 24	Co-Integration Test (EG) t: p: Long-Run Coefficients	-2.864688 0.156300	co (EV)	•	3		
20 21 22 23 24 25 26	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable	-2.864688 0.156300 Coefficient (EY)	se (EY)	t	3 Coefficient (OLS)	,	
20 21 22 23 24 25 26 27	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable c dri	-2.864688 0.156300 Coefficient (EY) -92.69590	se (EY) 9.405271	t -9.855739	3 <u>Coefficient (OLS)</u> -88.32354 -0.05445	,	
20 21 22 23 24 25 26 27	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable C dpi	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020	<b>se (EY)</b> 9.405271 0.009281	t -9.855739 96.97446	3 Coefficient (OLS) -88.32354 0.905445	,	
20 21 22 23 24 25 26 27 20 29	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable C dpi Trend Selection Info	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020	<b>se (EY)</b> 9.405271 0.009281	t -9.855739 96.97446	3 Coefficient (OLS) -88.32354 0.905445	,	
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20 21 22 23 24 25 26 27 20 29 30 31	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable C dpi Trend Selection Info AIC: SIC:	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020 12.89711 12.95230	se (EY) 9.405271 0.009281	t -9.855739 96.97446	3 Coefficient (OLS) -88.32354 0.905445	,	
20 21 22 23 24 25 26 27 20 29 30 31 32	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable C dpi Trend Selection Info AIC: SIC: H-O:	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020 12.89711 12.95230 12.91938	<u>se (EY)</u> 9.405271 0.009281	t -9.855739 96.97446	3 <u>Coefficient (OLS)</u> -88.32354 0.905445 4	,	
20 21 22 23 24 25 26 27 20 30 31 32 33	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable C dpi Trend Selection Info AIC: SIC: H-Q:	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020 12.89711 12.95230 12.91938	<u>se (EY)</u> 9.405271 0.009281	t -9.855739 96.97446	3 <u>Coefficient (OLS)</u> -88.32354 0.905445 4	,	
20 21 22 23 24 25 26 27 20 30 31 32 33 34	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable c dpi Trend Selection Info AIC: SIC: H-Q: t.tests for Dual Adjustment	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020 12.89711 12.95230 12.91938	<u>se (EY)</u> 9.405271 0.009281	t -9.855739 96.97446	3 <u>Coefficient (OLS)</u> -88.32354 0.905445 4	,	
20 21 22 23 24 25 26 27 20 30 31 32 33 34 35	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable c dpi Trend Selection Info AIC: SIC: H-Q: t-tests for Dual Adjustment Null Hypothesis	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020 12.89711 12.95230 12.91938	se (EY) 9.405271 0.009281	t -9.855739 96.97446	3 <u>Coefficient (OLS)</u> -88.32354 0.905445 4	)	
20 21 22 23 24 25 26 27 20 30 31 32 33 34 35 36	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable c dpi Trend Selection Info AIC: SIC: H-Q: t-tests for Dual Adjustment Null Hypothesis p1= t1	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020 12.89711 12.95230 12.91938 t 10.37835	se (EY) 9.405271 0.009281	t -9.855739 96.97446	3 <u>Coefficient (OLS</u> -88.32354 0.905445 4	,	
20 21 22 23 24 25 26 27 20 30 31 32 33 34 35 36 37	Co-Integration Test (EG) t: p: Long-Run Coefficients Variable C dpi Trend Selection Info AIC: SIC: H-Q: t-tests for Dual Adjustment Null Hypothesis p1= t1 t1= p1	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020 12.89711 12.95230 12.91938 t 10.37835 -0.801854	se (EY) 9.405271 0.009281	t -9.855739 96.97446	3 <u>Coefficient (OLS)</u> -88.32354 0.905445 4	,	
20 21 22 23 24 25 26 27 20 20 30 31 32 33 33 34 35 36 37 38	Co-Integration Test (EG)         t:         p:         Long-Run Coefficients         Variable         C         dpi         Trend Selection Info         AIC:         SIC:         H-Q:         t-tests for Dual Adjustment         Null Hypothesis         p1 = t1         t1 = p1	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020 12.89711 12.95230 12.91938 t 10.37835 -0.801854	se (EY) 9.405271 0.009281	t -9.855739 96.97446	3 <u>Coefficient (OLS)</u> -88.32354 0.905445 4	,	
20 21 22 23 24 25 26 27 20 20 30 31 32 33 33 33 33 33 33 33 33 33 33 33 33	Co-Integration Test (EG)         t:         p:         Long-Run Coefficients         Variable         C         dpi         Trend Selection Info         AIC:         SIC:         H-Q:         t-tests for Dual Adjustment         Null Hypothesis         p1= t1         t1= p1	-2.864688 0.156300 Coefficient (EY) -92.69590 0.900020 12.89711 12.95230 12.91938 t 10.37835 -0.801854	se (EY) 9.405271 0.009281	t -9.855739 96.97446	3 <u>Coefficient (OLS)</u> -88.32354 0.905445 4	,	

You can use this software freely by citing it as follows:

#### Kucuker, M. C. & İsmihan, M. (2021). Dual Adjustment Software for Eviews: Version 3.01

#### References

İsmihan, M. (2019) The dual adjustment approach with an application to the consumption function, *Central Bank Review*, 19 (2019), 1-8.

İsmihan, M. ve Küçüker, M. C. (2019). İkili Uyarlanma Yaklaşımı: Türkiye İçin Yatırım Fonksiyonu Uygulaması. I. Ş. Selçuk (Ed.), Belirsizlik Altında Ekonomik Kararlar ve Politikalar (s. 37-71) içinde. Ankara: Türkiye Ekonomi Kurumu

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