

Real GDP growth in Africa, 1963-2016

Philip Hans Franses

Simeon Vasilev

Econometric Institute

Erasmus School of Economics

EI2019-23

Abstract

This paper provides a balanced panel data set for real GDP growth in Africa. For 18 of the 52 countries there are missing data. We use a model-based imputation technique based on World Bank data to fill in the gaps.

JEL Codes: E0, N1

Key words: Balanced panel data; Africa; real GDP growth; Missing data; Imputation; Principal components regression

Address for correspondence: PH Franses, Econometric Institute, Erasmus School of Economics, POB 1738. NL-3000 DR Rotterdam, the Netherlands, phone +31104081273, email: franses@ese.eur.nl. Full estimation results are available upon request.

This paper aims to provide a complete balanced panel data set on annual real GDP growth for 52 countries on the African continent, for the years 1963-2016, although some earlier years are available too. For 34 countries the full data can be obtained from the World Bank. For 18 countries there are missing data, see Table 1 for a list of these countries and the years with missing data. For South Sudan the sample is too small to include.

We impute estimates of real GDP growth for the missing observations using a Principal Components regression. For that purpose, we collect data, again from the World Bank, in three categories, that is, demographic variables, production variables and financial variables.

An illustration is given for Angola. For Angola, the data for 1961-1979 are missing, as is clear from Figure 1. We can collect for 1962-2014 the data on 14 demographic variables, 9 production variables and 2 financial variables, see Table 2. For each of these categories we create principal components (PCs). We choose the number of principal components using the Kaiser rule (eigenvalue larger than 1), the cumulative proportion of the variance (with 75% as a cutoff point) and that the individual proportion of the variance is in excess of 5%. For Angola this results in 1 PC for the financial variables, 3 PCs for the demographic variables and 3 PCs for the population variables. These 7 variables are then included in a Principal Component regression for the sample 1988-2014, see Table 3. Forecasts are made for the period 1980-1987. When these predictions are reasonably adequate for this out-of-sample period, that is, with Mean Squared Prediction Error is about equal to the in-sample Mean Squared Error, the Principal Component regression is run for the full sample 1980-2014, see Table 4. Finally, the predictions are made for the sample 1961-1979, see Figure 2. These (rounded at one decimal) predictions are then imputed and can be used for further analysis.

This procedure is followed for all 18 countries with missing data, where each country may have different sets of demographic variables, production variables and financial variables. Tables A1 to A5 include the full samples, where in italics the imputed data are presented. Figures A1 to A5 visualize the data, and these graphs suggest that the imputed data have face value. For the common sample 1963 to 2016, some summary statistics for all 52 countries are provided in Table 5.

Table 1: Countries with missing data

Country	Years (missing)
Angola	1961-1979
Cabo Verde	1961-1979
Comoros	1961-1979
Djibouti	1961-1990
Equatorial Guinea	1961-1979
Eritrea	1961-1992
Ethiopia	1961-1979
Gambia	1961-1966
Guinea	1961-1979
Guinea-Bissau	1961-1970
Libya	1961-1979
Mali	1961-1967
Mauritius	1961-1976
Morocco	1961-1966
Mozambique	1961-1979
Namibia	1961-1980
Sao Tome and Principe	1961-1979
Somalia	1991-2007, 2011
South Sudan	1961-2008



Figure 1: Real GDP growth Angola, 1980-2015 (source: World Bank)

Table 2: Variables available for Angola (source: World Bank) in three categories: Demographic (D), Production (P) and Financial (F)

Variable	Category
Adolescent fertility rate (births per 1000 women ages 15-19)	D
Age dependency ratio (% of working-age population)	D
Age dependency ratio, old (% of working-age population)	D
Age dependency ratio, young (% of working-age population)	D
Arable land (hectares per person)	P
Birth rate, crude (per 1000 people)	D
Capture fisheries production (metric tons)	P
Create production (metric tons)	P
Cereal yield (kilogram per hectare)	P
Crop production index (2004-2006 = 100)	P
Death rate, crude (per 1000 people)	D
DEC alternative conversion factor (LCU per US\$)	F
Fertility rate, total (births per woman)	D
Food production index (2004-2006 = 100)	P
Life expectancy at birth, female (years)	D
Life expectancy at birth, male (years)	D
Livestock production index (2004-2006 = 100)	P
Merchandise exports (current US\$)	P
Mortality rate, adult, female (per 1000 female adults)	D
Mortality rate, adult, male (per 1000 male adults)	D
Population growth (annual %)	D
Population, male (% of total)	D
Official exchange rate (LCU per US\$, period average)	F
Total fisheries production (metric tons)	P
Urban population growth (annual %)	D

Table 3: Principal component (PC) regression with 1 PC for the financial variables, 3 PCs for the demographic variables and 3 PCs for the population variables: Evaluation sample, 1988-2014

Dependent Variable: GDP_REAL_GROWTH

Method: Least Squares

Date: 05/31/18 Time: 15:42

Sample (adjusted): 1988 2014

Included observations: 27 after adjustments

HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.972208	2.367288	2.100381	0.0493
PC1F	2.726950	1.367113	1.994678	0.0606
PC1D	-1.149343	0.760139	-1.512016	0.1470
PC2D	-0.077103	1.511341	-0.051016	0.9598
PC3D	-3.215726	1.027212	-3.130538	0.0055
PC1P	0.243801	0.370401	0.658208	0.5183
PC2P	0.108330	1.746276	0.062035	0.9512
PC3P	2.388058	0.589193	4.053100	0.0007
R-squared	0.531100	Mean dependent var		4.973467
Adjusted R-squared	0.358348	S.D. dependent var		9.204050
S.E. of regression	7.372738	Akaike info criterion		7.074650
Sum squared resid	1032.788	Schwarz criterion		7.458602
Log likelihood	-87.50778	Hannan-Quinn criter.		7.188819
F-statistic	3.074342	Durbin-Watson stat		1.767064
Prob(F-statistic)	0.024231	Wald F-statistic		5.271538
Prob(Wald F-statistic)	0.001797			

Table 4: Principal component (PC) regression with 1 PC for the financial variables, 3 PCs for the demographic variables and 3 PCs for the population variables: Evaluation plus test sample, 1980-2014

Dependent Variable: GDP_REAL_GROWTH
 Method: Least Squares
 Date: 05/31/18 Time: 20:46
 Sample (adjusted): 1980 2014
 Included observations: 35 after adjustments
 HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.903530	0.897987	4.346977	0.0002
PC1F	2.792937	1.090462	2.561242	0.0163
PC1D	-1.543057	0.340563	-4.530903	0.0001
PC2D	-0.508848	0.783550	-0.649413	0.5216
PC3D	-2.875954	0.722889	-3.978415	0.0005
PC1P	0.264689	0.345665	0.765738	0.4505
PC2P	-0.059794	0.972125	-0.061509	0.9514
PC3P	2.481588	0.438641	5.657445	0.0000
R-squared	0.546464	Mean dependent var		4.476675
Adjusted R-squared	0.428881	S.D. dependent var		8.278732
S.E. of regression	6.256438	Akaike info criterion		6.702731
Sum squared resid	1056.862	Schwarz criterion		7.058239
Log likelihood	-109.2978	Hannan-Quinn criter.		6.825452
F-statistic	4.647463	Durbin-Watson stat		1.790007
Prob(F-statistic)	0.001608	Wald F-statistic		9.089981
Prob(Wald F-statistic)	0.000010			

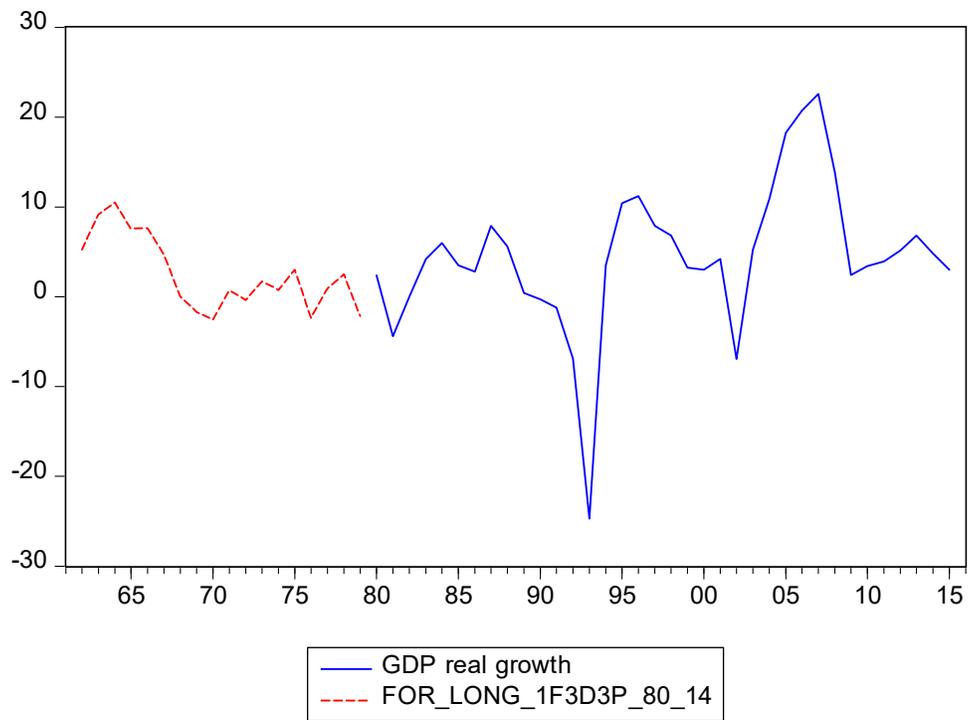


Figure 2: Extrapolated Real GDP growth for 1961-1979, based on the Principal Components regression in Table 4

Table 5: Summary statistics for real GDP growth, 1963-2016

Country	Mean	Standard Deviation	Minimum	Maximum
Algeria	4.594	6.429	-11.3	34.3
Angola	3.681	7.111	-24.7	22.6
Benin	3.769	2.981	-4.9	10.0
Botswana	8.413	6.129	-7.7	26.4
Burkina Faso	4.354	3.204	-1.8	11.0
Burundi	2.776	5.285	-8.0	21.3
Cabo Verde	5.922	4.812	-2.3	19.2
Cameroon	3.767	5.674	-10.9	22.0
Central African Republic	1.159	6.430	-36.7	9.5
Chad	3.583	8.669	-21.4	33.6
Comoros	3.130	3.346	-5.4	13.5
Congo, Democratic Republic	1.313	5.304	-13.5	9.5
Congo, Republic	4.185	5.645	-9.0	23.6
Djibouti	2.411	3.296	-6.6	7.1
Egypt	5.004	2.848	0.6	14.6
Equatorial Guinea	12.678	26.021	-36.8	150.0
Eritrea	4.707	6.815	-14.3	21.2
Ethiopia	3.544	7.134	-14.0	13.9
Gabon	4.104	9.591	-24.0	39.5
Gambia	3.909	3.353	-4.3	12.4
Ghana	3.600	4.458	-12.4	14.0
Guinea	3.404	1.600	-1.5	6.6
Guinea Bissau	2.056	6.633	-28.1	18.2
Ivory Coast	3.985	5.464	-11.0	17.6
Kenya	4.887	4.289	-4.7	22.2
Lesotho	4.794	5.792	-13.5	26.4

Liberia	1.994	20.223	-51.0	106.3
Libya	0.322	2.251	-62.1	104.5
Madagascar	1.954	4.085	-12.7	9.9
Malawi	4.319	5.042	-10.2	16.7
Mali	4.104	5.109	-7.4	20.3
Mauritania	3.846	5.923	-5.1	27.7
Mauritius	5.776	3.996	-10.1	14.2
Morocco	5.007	3.898	-5.4	13.3
Mozambique	5.563	6.072	-15.7	26.8
Namibia	4.196	2.653	-1.8	12.3
Niger	2.454	5.875	-17.0	13.5
Nigeria	4.119	8.432	-15.7	33.7
Rwanda	4.702	10.423	-50.2	35.2
Sao Tome and Principe	4.476	6.479	-10.3	27.4
Senegal	2.983	3.621	-6.6	8.9
Seychelles	4.698	6.175	-8.2	21.2
Sierra Leone	2.704	7.387	-20.5	26.3
Somalia	2.407	9.299	-26.3	30.1
South Africa	2.983	2.446	-2.1	7.9
Sudan	3.970	5.370	-6.3	16.7
Tanzania	4.624	2.005	0.5	8.5
Togo	3.719	5.749	-15.1	15.5
Tunisia	4.693	3.455	-1.9	17.7
Uganda	5.487	3.991	-6.8	15.8
Zambia	3.461	4.719	-8.6	16.6
Zimbabwe	2.920	7.623	-17.7	22.6

Appendix: The final data

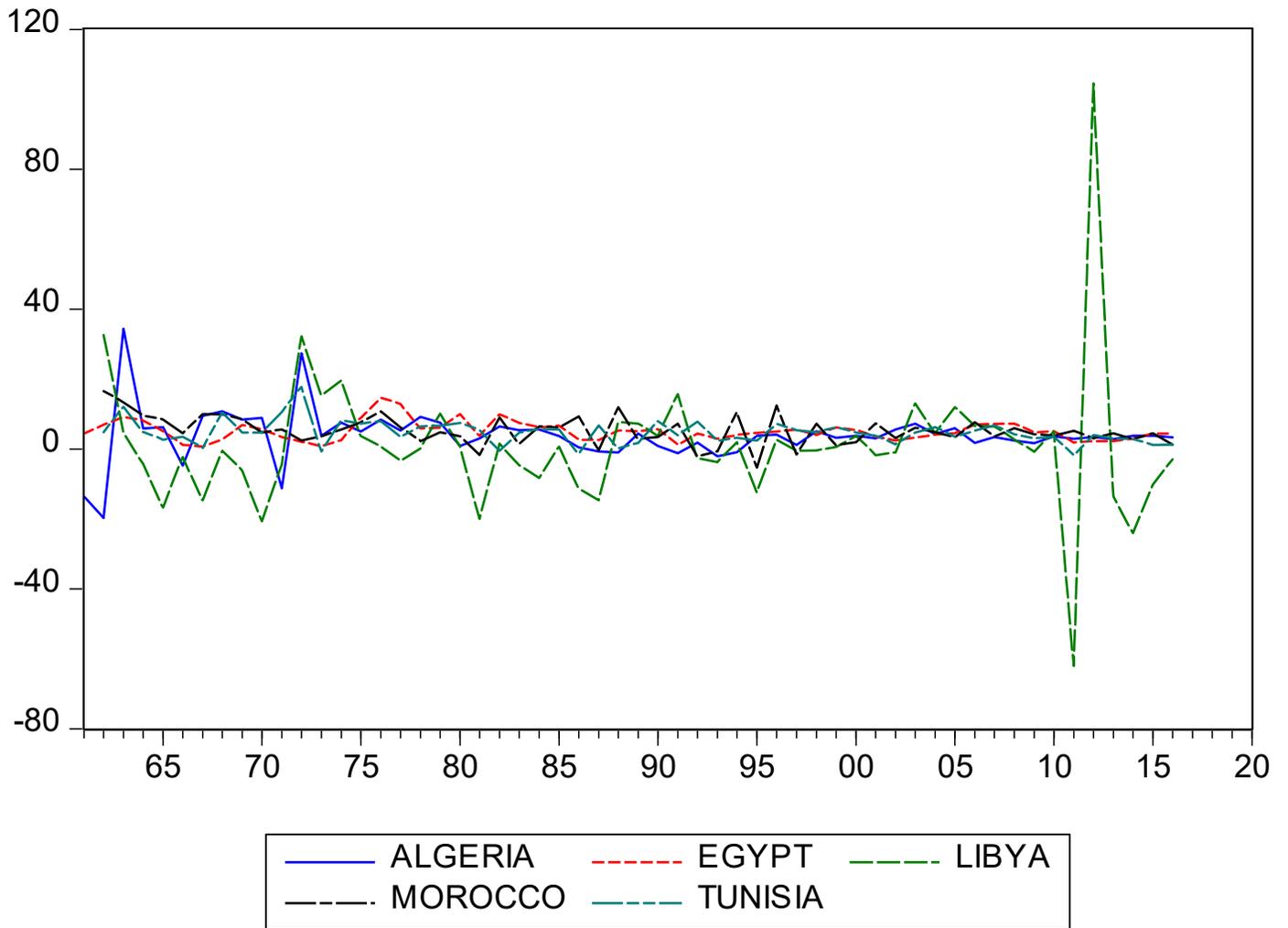


Figure A1: real GDP growth in North Africa

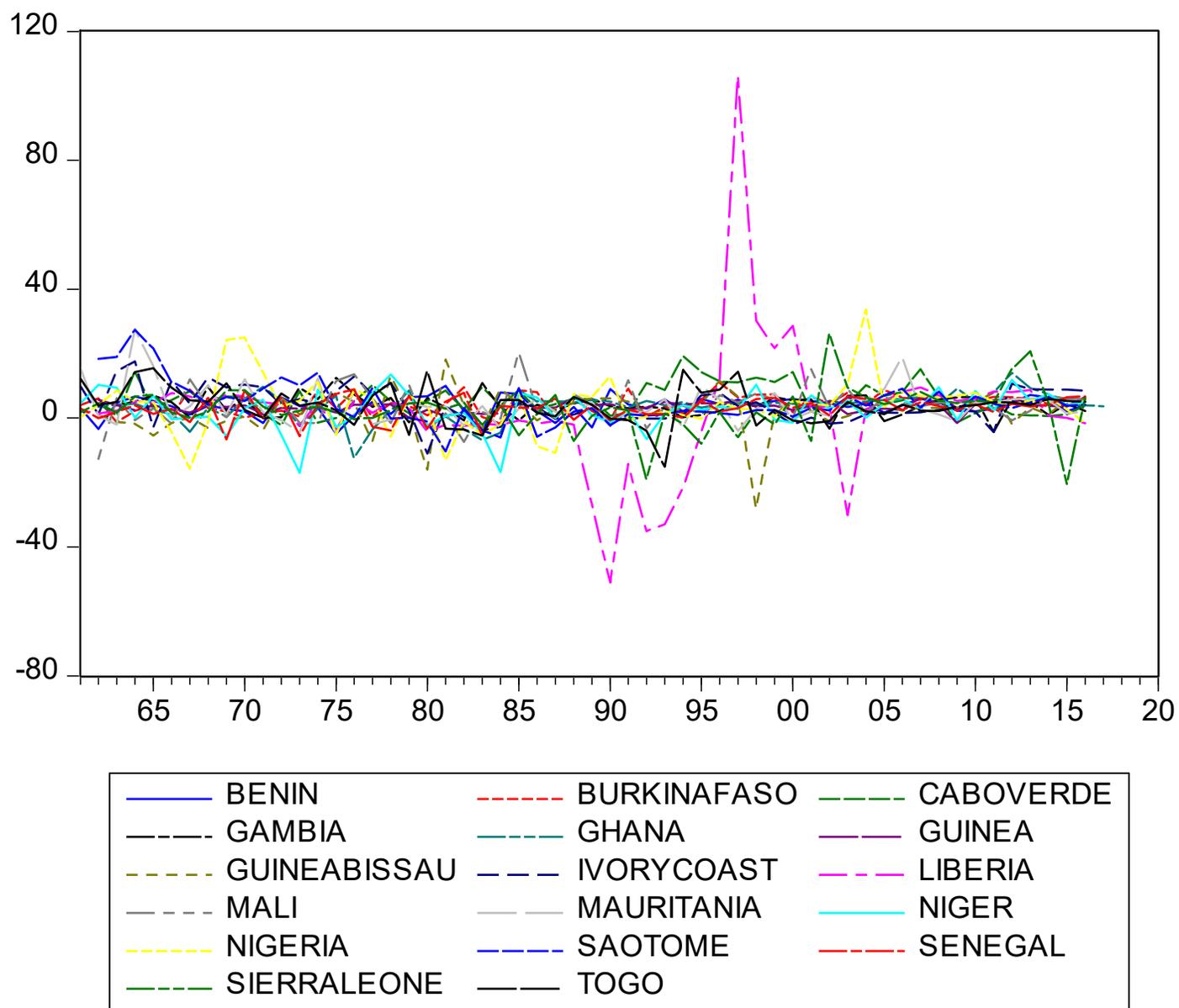


Figure A2: real GDP growth in West Africa

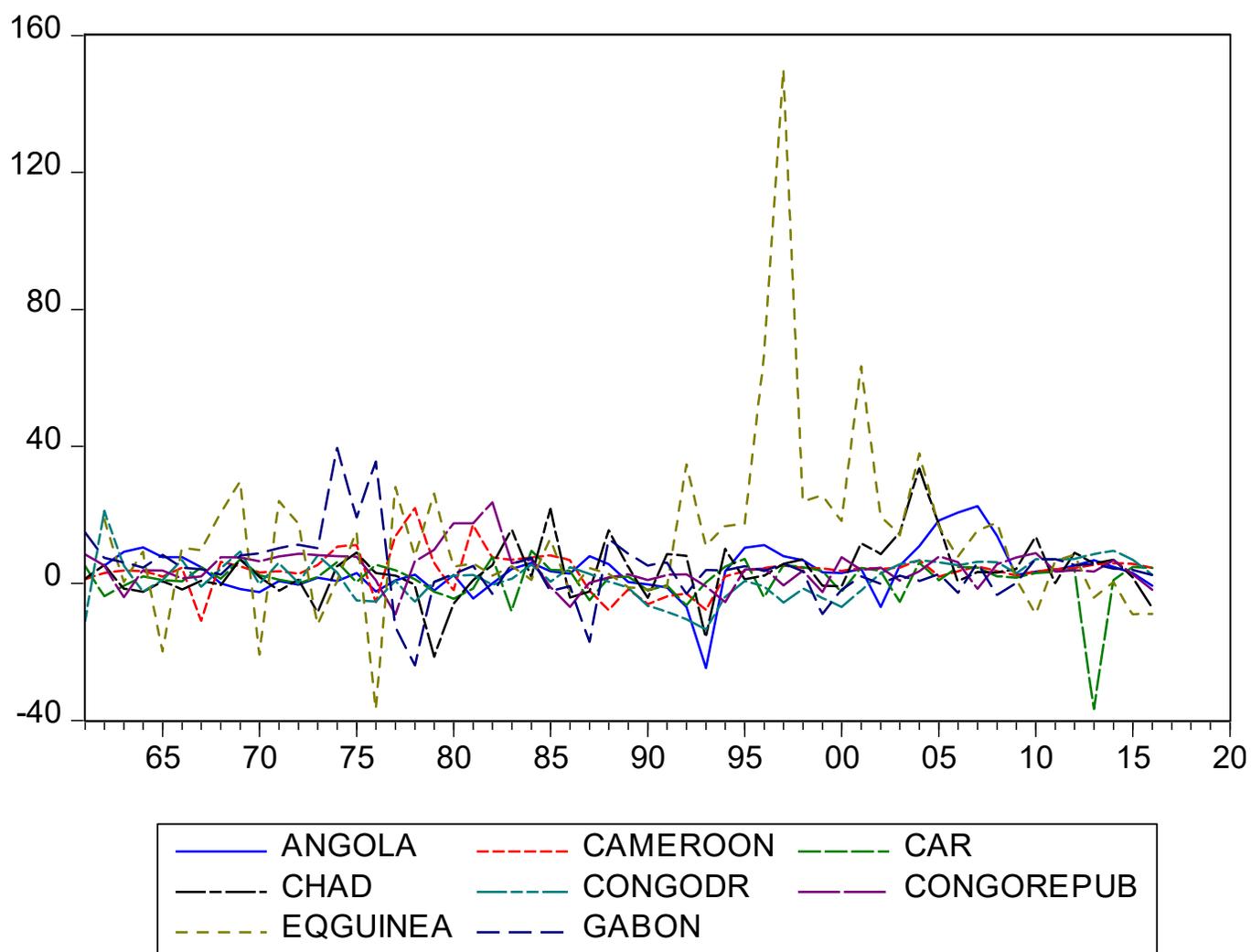


Figure A3: real GDP growth in Central Africa

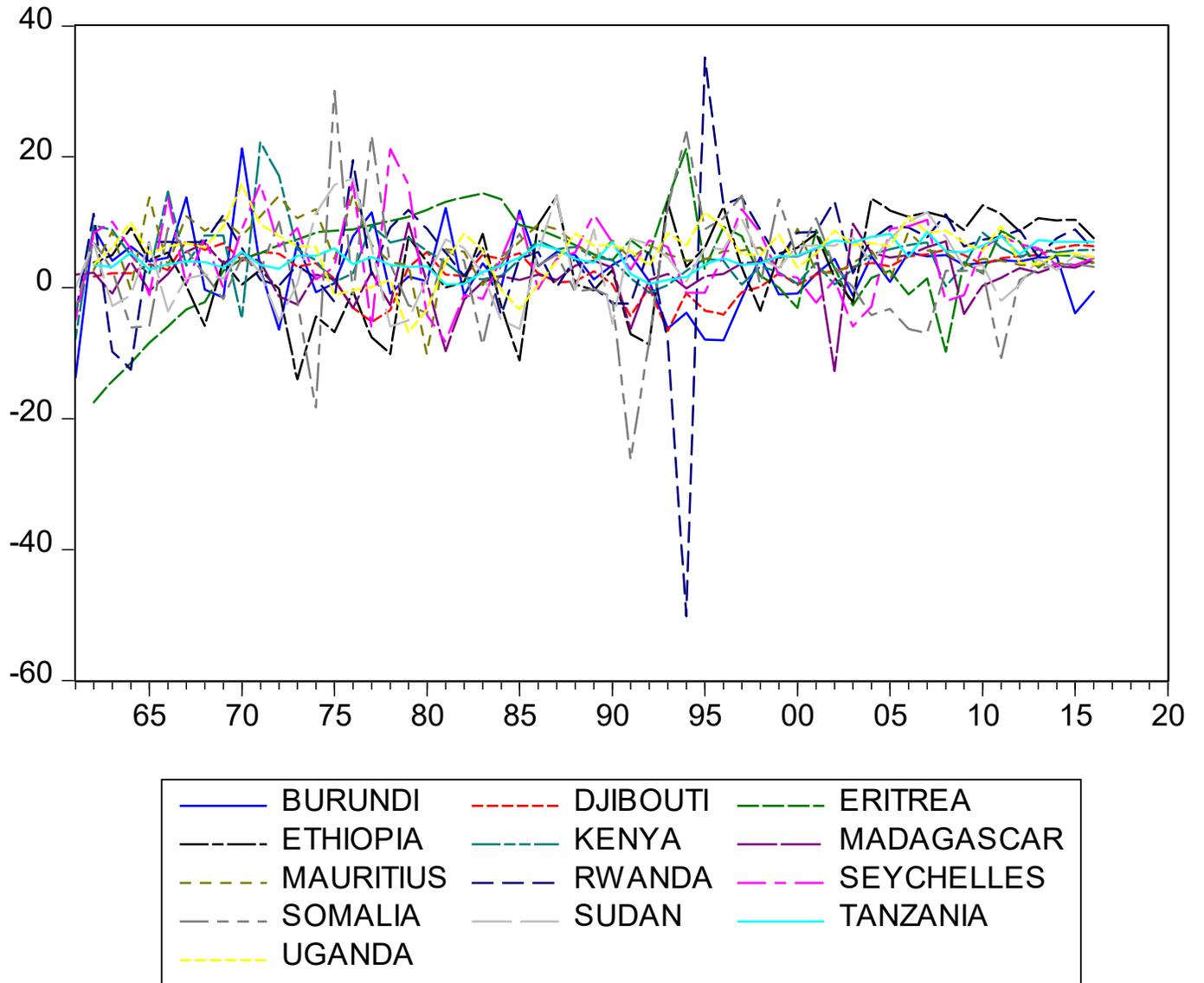


Figure A4: real GDP growth in East Africa

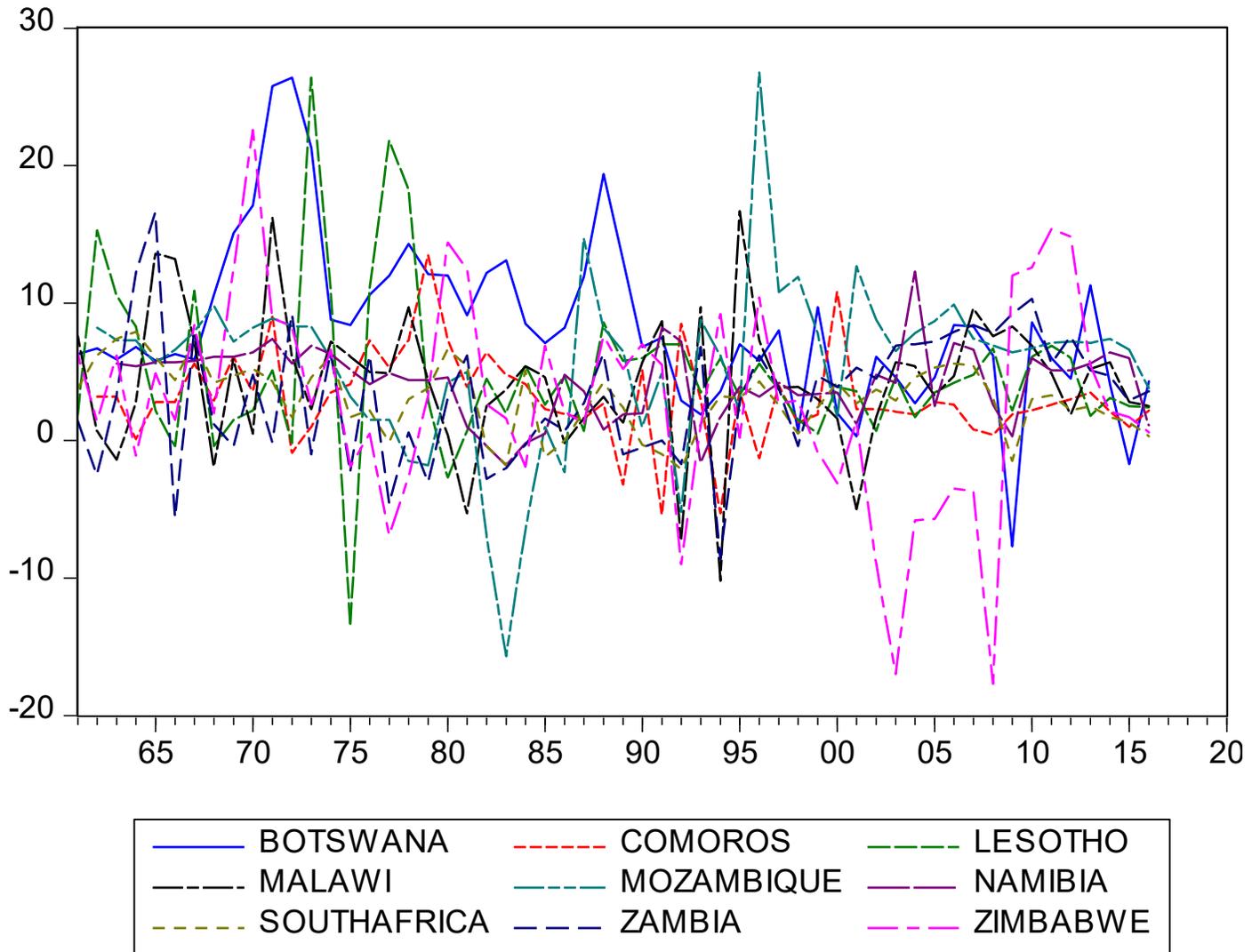


Figure A5: real GDP growth in South Africa

Table A1: real GDP growth in North Africa

	ALGERIA	EGYPT	LIBYA	MOROCCO	TUNISIA
1961	-13.6	4.4	NA	NA	NA
1962	-19.7	6.9	32.6	16.6	4.8
1963	34.3	9.1	4.70	13.3	12.0
1964	5.8	8.1	-4.30	9.5	4.9
1965	6.2	5.1	-16.8	8.4	2.6
1966	-4.8	1.1	-2.3	4.5	3.5
1967	9.5	0.6	-14.7	10.0	0.2
1968	10.8	2.7	-0.5	9.9	10.4
1969	8.4	6.8	-6.2	8.4	4.7
1970	8.9	5.6	-20.7	4.7	4.7
1971	-11.3	3.4	-4.5	5.6	10.6
1972	27.4	2.0	32.2	2.4	17.7
1973	3.8	0.7	15.3	3.6	-0.7
1974	7.5	2.5	19.6	5.6	8.1
1975	5.0	8.9	3.7	7.6	7.2
1976	8.4	14.6	0.6	10.8	7.9
1977	5.3	12.8	-3.5	6.1	3.4
1978	9.2	5.8	0.1	2.2	6.4
1979	7.5	6.0	10.1	4.8	6.6
1980	0.8	10.0	0.6	3.6	7.4
1981	3.0	3.8	-20.0	-1.7	5.5
1982	6.4	9.9	1.5	9.0	-0.5
1983	5.4	7.4	-4.7	1.4	4.7
1984	5.6	6.1	-8.3	6.4	5.7
1985	3.7	6.6	0.6	6.0	5.6
1986	0.4	2.6	-11.4	9.3	-1.4
1987	-0.7	2.5	-14.7	-0.3	6.7
1988	-1.0	5.3	7.6	11.9	0.1
1989	4.4	5.0	7.2	2.8	1.7
1990	0.8	5.7	3.7	3.4	7.9
1991	-1.2	1.1	15.7	7.2	3.9
1992	1.8	4.4	-2.7	-2.1	7.8
1993	-2.1	2.9	-3.8	-0.7	2.2
1994	-0.9	4.0	1.9	10.6	3.2
1995	3.8	4.6	-12.4	-5.4	2.4
1996	4.1	5.0	2.6	12.4	7.1
1997	1.1	5.5	-0.6	-1.6	5.4
1998	5.1	4.0	-0.4	7.2	4.8
1999	3.2	6.1	0.5	1.1	6.1
2000	3.8	5.4	3.7	1.9	4.7
2001	3.0	3.5	-1.8	7.3	3.8
2002	5.6	2.4	-1.0	3.1	1.3
2003	7.2	3.2	13.0	6.0	4.7

2004	4.3	4.1	4.5	4.8	6.2
2005	5.9	4.5	11.9	3.3	3.5
2006	1.7	6.9	6.5	7.6	5.2
2007	3.4	7.1	6.4	3.5	6.7
2008	2.4	7.2	2.7	5.9	4.2
2009	1.6	4.7	-0.8	4.2	3.0
2010	3.6	5.1	5.0	3.8	3.5
2011	2.9	1.8	-62.1	5.2	-1.9
2012	3.4	2.2	104.5	3.0	4.0
2013	2.8	2.2	-13.6	4.5	2.9
2014	3.8	2.9	-24.0	2.7	2.8
2015	3.8	4.4	-10.2	4.5	1.1
2016	3.3	4.3	-3.0	1.2	1.2

Table A2: real GDP growth in West Africa, 1

	BENIN	BURKINAFASO	CABOVERDE	GAMBIA	GHANA	GUINEA	GUINEABISSAU	IVORYCOAST
1961	3.1	4.0	NA	NA	NA	NA	NA	9.9
1962	-3.4	6.1	4.5	4.5	3.4	5.7	0.8	1.2
1963	4.7	-1.3	0.6	3.9	4.1	4.0	-1.2	14.5
1964	6.7	2.3	14.4	5.1	4.4	2.4	-1.8	17.6
1965	5.3	3.8	3.1	7.0	2.2	4.0	-5.4	-3.1
1966	3.6	0.5	5.6	4.9	1.4	2.6	-1.5	11.6
1967	1.1	8.8	8.3	0.0	-4.3	1.7	0.1	4.6
1968	3.8	3.1	3.5	9.6	3.1	4.0	-3.2	12.5
1969	2.9	2.0	6.7	2.4	0.4	3.4	-0.9	9.5
1970	2.1	0.1	6.5	6.2	6.0	3.9	0.4	10.4
1971	-1.5	1.4	1.3	-0.1	9.7	1.2	-3.9	9.5
1972	6.4	2.3	-2.3	0.2	5.2	3.2	6.4	4.2
1973	3.7	0.4	8.3	9.3	-2.5	2.9	1.1	5.9
1974	3.3	8.3	-1.40	5.9	2.9	3.3	4.6	4.3
1975	-4.9	3.0	0.0	12.4	6.9	1.7	7.8	8.3
1976	0.9	8.5	5.1	7.4	-12.4	4.1	4.9	12.9
1977	5.0	0.4	10.3	3.4	-3.5	4.0	-7.2	7.3
1978	1.3	4.6	5.0	6.3	2.3	4.2	13.1	10.9
1979	6.5	3.7	1.5	-1.3	8.5	0.0	2.0	2.4
1980	6.8	0.8	5.3	6.3	-2.5	2.6	-16.0	-11.0.
1981	10.0	4.3	8.5	3.3	0.5	0.6	18.2	3.5
1982	2.2	9.6	2.8	-0.8	-3.5	1.8	4.2	0.2
1983	-4.3	0.3	9.5	10.9	-6.9	1.3	-3.4	-3.9
1984	7.9	-1.8	3.8	3.5	-4.6	1.4	9.1	-2.7
1985	7.5	8.5	8.6	-0.8	8.6	5.0	4.2	4.5
1986	2.2	8.0	2.9	4.1	5.1	3.1	-0.8	3.3
1987	-1.5	-0.2	4.3	2.5	5.2	3.3	2.9	-0.3
1988	3.4	5.8	6.0	4.5	4.8	6.3	4.6	1.1
1989	-2.9	2.2	5.7	5.9	5.6	4.0	6.1	2.9
1990	9.0	-0.6	0.7	3.6	5.1	4.3	6.1	-1.1
1991	4.2	9.1	1.4	3.1	3.3	2.6	5.1	0.0
1992	3.0	0.2	10.9	3.4	5.3	3.3	1.1	-0.2
1993	5.8	3.5	8.7	3.0	3.9	5.0	2.1	-0.2
1994	2.0	1.3	19.2	0.2	4.9	4.0	3.2	0.8
1995	6.0	5.7	14.2	0.9	3.3	4.6	4.4	7.1
1996	4.3	11.0	11.3	2.2	4.1	4.5	11.6	7.7
1997	5.7	6.3	11.1	4.9	4.6	5.2	6.5	3.7
1998	4.0	7.3	12.5	3.5	4.2	3.6	-28.1	4.9
1999	5.3	7.4	11.2	6.4	4.7	3.8	1.0	1.6
2000	5.9	1.8	14.3	5.5	4.4	2.5	5.4	-2.1

2001	5.3	6.6	2.2	5.8	3.7	3.7	2.2	0.1
2002	4.6	4.4	5.3	-3.3	4.0	5.2	-1.0	-1.7
2003	3.4	7.8	4.2	6.9	4.5	1.2	0.6	-1.4
2004	4.4	4.5	10.2	7.1	5.2	2.3	2.8	1.2
2005	1.7	8.7	6.9	-0.9	5.6	3.0	4.3	1.7
2006	3.9	6.3	8.0	1.1	5.9	2.5	2.3	1.5
2007	6.0	5.7	15.2	3.6	6.4	6.5	3.2	1.8
2008	4.9	7.3	6.7	5.7	4.3	4.1	3.2	2.5
2009	2.3	3.0	-1.3	6.4	9.1	-1.5	3.3	3.3
2010	2.1	5.4	1.5	6.5	4.8	4.3	4.7	2.0
2011	3.0	6.6	4.0	-4.3	7.9	5.5	8.1	-4.4
2012	4.8	6.5	1.1	5.6	14.0	5.9	-1.7	10.7
2013	7.2	5.8	0.8	4.8	9.3	3.9	3.3	8.9
2014	6.4	4.3	0.6	0.9	7.3	3.7	1.0	8.8
2015	2.1	3.9	1.1	4.3	4.0	3.5	6.1	8.8
2016	4.0	5.9	3.9	2.2	3.9	6.6	5.8	8.3

Table A2: real GDP growth in West Africa, 2

	LIBERIA	MALI MAURITANIA	NIGER	NIGERIA	SAOTOME	SENEGAL SIERRALEONE	TOGO		
1961	2.4	NA	15.5	4.5	0.2	NA	3.0	1.8	12.2
1962	1.3	-12.7	0.7	10.3	4.1	18.4	-0.1	4.5	3.8
1963	2.3	6.2	-2.0	9.4	8.6	19.0	1.9	1.7	5.0
1964	5.2	-0.7	27.7	0.1	5.0	27.4	3.9	6.7	14.3
1965	4.8	3.1	16.1	6.9	4.9	21.6	1.3	7.2	15.
1966	7.7	-1.9	0.2	-0.4	-4.3	11.3	2.9	1.7	9.40
1967	6.7	12.0	3.6	0.1	-15.7	8.40	-1.2	0.0	5.5
1968	4.8	3.7	10.2	0.4	-1.2	4.1	6.3	2.0	5.0
1969	7.3	0.2	1.2	-5.5	24.2	6.6	-6.6	8.5	10.8
1970	6.7	6.1	12.0	3.1	25.0	5.3	8.6	8.6	2.5
1971	4.9	2.6	1.8	5.7	14.2	9.2	-0.1	3.5	0.0
1972	4.1	5.8	-0.7	-5.2	3.4	12.6	6.4	0.9	7.6
1973	-2.3	-1.5	-4.6	-17.0	5.4	10.1	-5.6	2.3	3.8
1974	4.8	-1.5	12.2	8.8	11.2	14.1	4.2	3.5	4.8
1975	-3.5	11.6	-5.1	-2.8	-5.2	2.9	7.5	1.7	2.4
1976	5.3	13.6	8.5	0.7	9.0	0.2	8.9	-0.4	-2.1
1977	1.6	6.3	-1.9	7.8	6.0	9.2	-2.7	0.0	7.0
1978	4.8	-1.5	-0.5	13.5	-5.8	-0.2	-4.0	2.4	11.0
1979	3.3	10.4	4.8	7.1	6.8	0.0	7.0	4.5	-5.2
1980	-4.1	-4.3	3.4	-2.2	4.2	-1.1	-3.3	4.8	14.6
1981	-2.1	1.5	3.5	0.6	-13.1	-10.3	5.1	2.9	-3.3
1982	-2.4	-7.4	-2.3	1.6	-1.1	3.1	7.8	4.8	-3.6
1983	-1.9	1.8	3.7	-4.8	-5.1	-3.9	-5.3	-2.1	-5.4
1984	-2.1	-0.3	-3.2	-16.8	-2.0	-6.0	3.7	4.1	5.6
1985	-0.8	20.3	3.0	7.7	8.3	9.3	3.3	-5.3	5.6
1986	-1.7	2.7	5.7	6.4	-8.8	-5.8	3.1	1.2	1.6
1987	-1.0	-0.1	1.9	0.1	-10.8	-2.9	6.1	7.2	0.5
1988	-2.0	7.4	1.7	6.9	7.5	2.0	-0.6	-7.1	6.6
1989	-26.7	4.2	4.8	0.9	6.5	3.1	4.0	0.7	4.1
1990	-51.0	-2.5	-1.8	-1.3	12.8	-2.2	-0.7	3.3	-0.2
1991	-14.2	11.7	1.8	2.5	-0.6	1.2	2.6	2.4	-0.7
1992	-35.1	-3.2	1.9	-6.5	0.4	0.7	1.2	-19.0	-4.0
1993	-33.0	3.2	5.9	1.4	2.1	1.1	1.3	1.4	-15.1
1994	-21.8	3.8	-3.1	4.0	0.9	2.2	0.0	-1.9	15.0
1995	-4.3	0.9	9.8	2.6	-0.3	2.0	5.4	-8.0	7.8
1996	12.1	7.1	5.8	3.4	5.0	1.5	2.0	1.8	8.8
1997	106.3	4.8	-4.0	2.8	2.8	1.0	3.1	-5.9	14.4
1998	30.2	7.6	2.8	10.4	2.7	2.5	5.9	1.8	-2.3
1999	21.7	5.7	7.7	-0.6	0.5	2.5	6.3	-2.0	2.5
2000	28.6	-0.1	-0.4	-1.4	5.3	0.4	3.2	6.7	-0.8

2001	2.9	15.4	2.0	7.1	4.4	3.2	4.6	-7.1	-1.6
2002	3.8	3.1	0.7	3.0	3.8	2.4	0.7	26.3	-0.9
2003	-30.1	9.1	6.0	5.3	10.4	6.6	6.7	9.4	5.0
2004	2.6	1.6	5.7	0.1	33.7	3.8	5.9	6.4	2.1
2005	5.3	6.5	9.0	4.5	3.4	7.1	5.6	4.3	1.2
2006	8.0	4.7	18.9	5.8	8.2	9.1	2.5	5.5	4.1
2007	9.5	3.5	2.8	3.1	6.8	3.3	4.9	8.1	2.3
2008	7.1	4.8	1.1	9.6	6.3	8.2	3.7	5.4	2.2
2009	5.3	4.7	-1.0	-0.7	6.9	2.4	2.4	4.6	3.5
2010	6.1	5.4	4.8	8.4	7.8	6.7	4.2	5.4	4.0
2011	8.2	3.2	4.7	2.3	4.9	4.4	1.8	4.8	4.9
2012	8.0	-0.8	5.8	11.8	4.3	3.1	4.4	15.2	4.8
2013	8.7	2.3	6.1	5.3	5.4	4.8	3.5	20.7	4.0
2014	0.7	7.0	5.6	7.5	6.3	6.5	4.1	4.6	5.9
2015	0.0	6.0	1.4	4.0	2.7	3.8	6.5	-20.5	5.3
2016	-1.6	5.8	2.0	5.0	-1.6	4.1	6.7	6.3	5.0

Table A3: real GDP growth in Central Africa

	ANGOLA	CAMEROON	CAR	CHAD	CONGODR	CONGOREPUB	EQUINEA	GABON
1961	NA	1.2	5.0	1.4	-10.9	8.4	NA	14.8
1962	5.2	3.0	-3.7	5.4	21.2	5.2	18.7	7.4
1963	9.2	3.7	-0.7	-1.6	5.2	-4.0	0.4	6.1
1964	10.5	3.5	2.1	-2.5	-2.4	3.8	9.2	4.6
1965	7.6	2.0	0.9	0.6	1.0	3.7	-19.8	8.3
1966	7.6	4.6	0.6	-1.8	6.8	1.4	10.3	4.5
1967	4.7	-10.9	4.7	0.8	-1.0	2.1	9.6	4.1
1968	0.0	6.3	1.4	-0.5	4.3	7.6	20.6	2.5
1969	-1.7	4.9	7.1	6.9	9.3	7.5	29.7	8.1
1970	-2.6	3.1	2.3	1.9	-0.2	6.4	-20.8	8.7
1971	0.7	3.5	1.1	-2.2	6.0	7.8	24.0	10.3
1972	-0.4	2.7	0.0	1.1	0.2	8.6	17.6	11.3
1973	1.7	5.4	1.9	-8.4	8.1	8.2	-12.1	10.2
1974	0.7	10.7	6.3	5.0	3.1	7.9	0.7	39.5
1975	3.0	11.2	0.4	9.0	-5.0	7.7	15.1	19.2
1976	-2.4	-5.5	5.4	3.0	-5.3	0.9	-36.8	35.6
1977	0.9	13.7	3.8	2.2	0.8	-9.0	28.2	-12.6
1978	2.5	22.0	1.2	-0.5	-5.3	6.4	7.8	-24.0
1979	-2.1	6.0	-2.5	-21.4	0.4	9.8	26.2	0.5
1980	2.4	-2.0	-4.5	-6.0	2.2	17.6	4.8	2.6
1981	-4.4	17.1	-1.5	1.0	2.4	17.6	5.8	5.1
1982	0.0	7.5	7.7	5.3	-0.5	23.6	2.2	-3.1
1983	4.2	6.9	-8.1	15.7	1.4	5.9	5.0	5.6
1984	6.0	7.5	9.5	2.0	5.5	7.0	1.0	7.5
1985	3.5	8.1	3.9	21.8	0.5	-1.2	12.9	-2.3
1986	2.8	6.8	3.6	-4.1	4.7	-6.9	-2.3	-0.8
1987	7.9	-2.1	-4.9	-2.4	2.7	0.2	4.4	-17.1
1988	5.6	-7.8	1.7	15.5	0.5	1.8	2.7	12.8
1989	0.4	-1.8	2.0	4.9	-1.3	2.6	-1.2	8.5
1990	-0.3	-6.1	-2.1	-4.2	-6.6	1.0	-1.8	5.2
1991	-1.2	-3.8	-0.6	8.5	-8.4	2.4	-1.0	6.1
1992	-6.9	-3.1	-6.4	8.0	-10.5	2.6	34.7	-3.1
1993	-24.7	-7.9	0.3	-15.7	-13.5	-1.0	11.0	3.9
1994	3.5	2.1	4.9	10.1	-3.9	-5.5	16.7	3.7
1995	10.4	3.5	7.2	1.2	0.7	4.0	17.5	5.0
1996	11.2	4.4	-4.0	2.2	-1.0	4.3	66.6	3.6
1997	7.9	5.2	5.3	5.7	-5.6	-0.6	150.	5.7
1998	6.8	4.5	4.7	7.0	-1.6	3.7	23.8	3.5
1999	3.2	4.3	3.6	-0.7	-4.3	-2.6	25.7	-8.9
2000	3.0	3.6	-2.5	-0.9	-6.9	7.6	18.2	-1.9

2001	4.2	4.4	4.5	11.7	-2.1	3.8	63.4	2.1
2002	-6.9	4.2	3.6	8.5	2.9	4.6	19.5	-0.2
2003	5.2	4.6	-5.4	14.7	5.6	0.8	14.0	2.2
2004	10.9	6.8	6.0	33.6	6.7	3.5	38.0	0.7
2005	18.3	2.0	0.9	17.3	6.1	7.8	16.7	2.7
2006	20.7	3.5	4.8	0.6	5.3	6.2	7.7	-2.8
2007	22.6	4.9	4.6	3.3	6.3	-1.6	15.3	6.0
2008	13.8	3.5	2.1	3.1	6.2	5.6	17.8	-3.3
2009	2.4	2.2	1.7	4.2	2.9	7.5	1.3	0.1
2010	3.4	3.4	3.0	13.6	7.1	8.8	-8.9	7.1
2011	3.9	4.1	3.3	0.1	6.9	3.4	6.5	7.1
2012	5.2	4.5	4.1	8.9	7.2	3.8	8.3	5.3
2013	6.8	5.4	-36.7	5.7	8.5	3.4	-4.1	5.6
2014	4.8	5.9	1.0	6.9	9.5	6.8	0.4	4.3
2015	3.0	5.7	4.8	1.8	6.9	2.6	-9.0	3.9
2016	-0.7	4.5	4.5	-7.0	2.4	-1.9	-8.9	2.3

Table A4: real GDP growth in East Africa, 1

	BURUNDI	DJIBOUTI	ERITREA	ETHIOPIA	KENYA	MADAGASCAR	MAURITIUS	RWANDA
1961	-13.7	NA	NA	NA	-7.8	2.0	NA	-4.3
1962	9.1	1.7	-17.5	3.8	9.5	2.3	2.7	11.3
1963	4.1	2.2	-14.3	5.0	8.8	-0.9	8.6	-9.8
1964	6.3	2.2	-11.5	9.1	5.0	4.0	-0.2	-12.5
1965	4.0	3.6	-8.4	4.2	2.0	-0.5	13.8	7.0
1966	4.6	2.7	-5.9	5.4	14.7	2.1	3.4	7.0
1967	13.8	7.1	-3.3	0.4	3.4	5.5	10.9	6.9
1968	-0.3	5.8	-2.2	-5.8	8.0	6.8	8.7	7.0
1969	-1.5	6.8	2.6	4.0	8.0	3.7	10.4	11.0
1970	21.3	4.1	4.4	0.5	-4.7	5.3	7.9	6.0
1971	2.7	5.5	5.3	2.8	22.2	3.9	10.9	1.2
1972	-6.4	5.2	6.5	-0.2	17.1	-1.3	14.0	0.3
1973	6.9	3.2	7.4	-14.0	5.9	-2.6	10.6	3.4
1974	-0.7	3.7	8.4	-4.4	4.1	2.0	12.0	1.4
1975	0.7	1.3	8.7	-6.8	0.9	1.3	4.40	-2.1
1976	7.9	-3.1	8.9	-0.6	2.2	-3.1	14.2	19.5
1977	11.5	-5.3	9.6	-7.6	9.5	2.4	6.5	2.0
1978	-0.9	-3.4	10.2	-10.1	6.9	-2.7	3.8	9.2
1979	1.7	3.1	10.8	7.8	7.6	9.9	3.5	11.9
1980	1.0	5.5	11.9	4.0	5.6	0.8	-10.1	9.0
1981	12.2	2.0	13.1	0.0	3.8	-9.7	5.9	5.4
1982	-1.1	1.7	13.8	0.9	1.5	-1.8	5.5	1.8
1983	3.7	5.0	14.4	8.2	1.3	0.9	0.4	6.0
1984	0.2	4.3	13.5	-2.8	1.8	1.7	4.7	-4.2
1985	11.8	5.3	9.6	-11.1	4.3	1.2	7.0	4.4
1986	3.3	2.2	8.9	9.7	7.2	2.0	9.7	5.5
1987	5.5	0.8	7.8	13.9	5.9	1.2	8.9	0.0
1988	5.0	1.0	6.5	0.5	6.2	3.4	6.8	4.5
1989	1.3	2.5	5.1	-0.4	4.7	4.1	4.5	0.0
1990	3.5	0.5	4.2	2.7	4.2	3.1	7.2	-2.4
1991	5.0	-4.3	7.3	-7.1	1.4	-6.3	4.4	-2.5
1992	1.0	0.0	5.1	-8.7	-0.8	1.2	6.5	5.9
1993	-6.2	-6.6	13.5	13.1	0.4	2.1	5.1	-8.1
1994	-3.8	-0.9	21.2	3.2	2.6	-0.1	4.1	-50.2
1995	-7.9	-3.5	2.9	6.1	4.4	1.7	4.3	35.2
1996	-8.0	-4.1	9.3	12.4	4.1	2.1	5.6	12.7
1997	-1.6	-0.7	7.9	3.1	0.5	3.7	5.7	13.8
1998	4.7	0.1	1.8	-3.5	3.3	3.9	6.1	8.9
1999	-1.0	2.2	0.0	5.2	2.3	4.7	2.6	4.3
2000	-0.9	0.4	-3.1	6.1	0.6	4.8	9.0	8.4

2001	2.1	2.0	8.8	8.3	3.8	6.0	2.6	8.5
2002	4.4	2.6	3.0	1.5	0.5	-12.7	2.1	13.2
2003	-1.2	3.2	-2.7	-2.2	2.9	9.8	3.7	2.2
2004	4.8	3.8	1.5	13.6	5.1	5.3	5.7	7.4
2005	0.9	3.2	2.6	11.8	5.9	4.6	1.2	9.4
2006	5.4	4.8	-1.0	10.8	6.5	5.0	8.5	9.2
2007	4.8	5.1	1.4	11.5	6.9	6.2	5.7	7.7
2008	5.0	5.8	-9.8	10.8	0.2	7.1	5.4	11.2
2009	3.5	5.0	3.9	8.8	3.3	-4.0	3.3	6.3
2010	3.8	3.5	2.2	12.6	8.4	0.3	4.4	7.3
2011	4.2	4.5	8.7	11.2	6.1	1.5	4.1	7.8
2012	4.0	4.8	7.0	8.6	4.6	3.0	3.5	8.8
2013	4.6	5.0	3.1	10.6	5.9	2.3	3.4	4.7
2014	4.7	6.0	5.0	10.3	5.4	3.3	3.7	7.6
2015	-3.9	6.5	4.8	10.4	5.7	3.1	3.5	8.9
2016	-0.6	6.3	3.8	7.6	5.8	4.2	3.8	5.9

Table A4: real GDP growth in East Africa, 2

	SEYCHELLES	SOMALIA	SUDAN	TANZANIA	UGANDA
1961	-4.9	-3.3	0.0	NA	NA
1962	8.4	7.1	6.9	3.5	3.6
1963	10.1	2.8	-2.8	3.2	6.1
1964	5.9	-6.1	-1.1	5.4	10.0
1965	-1.1	-5.9	6.8	2.8	5.2
1966	13.9	9.1	-3.6	3.6	6.3
1967	0.5	5.9	1.4	4.0	6.8
1968	7.6	2.0	2.0	3.9	6.1
1969	0.0	-1.7	1.4	3.1	9.4
1970	8.9	4.6	5.9	5.5	15.8
1971	15.9	2.6	2.2	3.5	9.7
1972	6.3	10.1	-5.1	2.9	7.9
1973	9.1	-2.0	0.6	4.9	6.3
1974	1.3	-18.3	11.4	4.9	6.2
1975	3.2	30.1	15.7	6.0	-1.1
1976	16.3	-1.0	16.7	3.6	-0.4
1977	-6.2	23.3	6.2	4.7	0.1
1978	21.2	3.7	-5.9	3.5	1.2
1979	15.8	-2.7	-5.0	3.2	-6.8
1980	-4.2	-3.9	1.5	3.3	-3.4
1981	-8.2	5.7	7.4	0.5	3.9
1982	-1.1	4.1	6.0	0.6	8.2
1983	-1.7	-8.8	2.1	2.4	5.7
1984	4.5	3.6	-5.0	3.4	-0.3
1985	11.1	8.2	-6.3	4.6	-3.3
1986	-0.2	3.4	5.4	6.6	0.4
1987	4.4	5.1	14.2	5.9	4.0
1988	5.4	-0.6	-0.3	4.4	8.3
1989	11.2	-0.2	8.9	3.8	6.4
1990	7.0	-1.5	-5.5	7.0	6.5
1991	2.8	-26.3	7.5	2.1	5.6
1992	7.2	-8.2	6.6	0.6	3.4
1993	6.2	12.3	4.6	1.2	8.3
1994	-0.8	23.8	1.0	1.6	6.4
1995	-0.8	8.9	6.0	3.6	11.5
1996	4.9	10.6	5.9	4.5	9.1
1997	12.0	14.1	10.6	3.5	5.1
1998	8.4	0.5	4.3	3.7	4.9
1999	1.9	13.5	3.1	4.8	8.1
2000	1.5	4.5	6.3	4.9	3.1

2001	-2.3	10.6	6.5	6.0	5.2
2002	1.2	3.2	6.4	7.2	8.7
2003	-5.9	0.1	7.7	6.9	6.5
2004	-2.9	-4.2	3.9	7.8	6.8
2005	9.0	-3.2	7.5	8.2	6.3
2006	9.4	-6.3	10.1	4.7	10.8
2007	10.4	-7.0	11.5	8.5	8.4
2008	-2.1	2.6	7.8	5.6	8.7
2009	-1.1	2.6	3.2	5.4	6.8
2010	6.0	2.6	3.5	6.4	5.6
2011	7.9	-10.7	-2.0	7.9	9.4
2012	6.6	1.2	0.5	5.1	3.8
2013	6.0	2.8	4.4	7.3	3.6
2014	3.3	3.6	2.7	7.0	5.1
2015	3.5	3.6	4.9	7.0	5.2
2016	4.5	3.2	4.7	7.0	4.7

Table A5: real GDP growth in South Africa

	BOTSWANA	COMOROS	LESOTHO	MALAWI	MOZAMBIQUE	NAMIBIA	SOUTHAFRICA	ZAMBIA	ZIMBABWE
1961	6.3	NA	1.9	7.6	NA	NA	3.8	1.4	6.3
1962	6.7	3.2	15.3	0.7	8.2	NA	6.2	-2.5	1.4
1963	5.9	3.2	10.6	-1.4	7.3	5.6	7.4	3.3	6.2
1964	6.8	0.1	8.3	2.7	7.3	5.4	7.9	12.2	-1.1
1965	5.8	2.8	2.2	13.6	5.6	5.7	6.1	16.6	4.9
1966	6.3	2.8	-0.4	13.2	6.6	5.7	4.4	-5.6	1.5
1967	5.9	5.6	10.9	7.3	7.9	5.8	7.2	7.9	8.4
1968	10.6	2.9	-0.4	-1.9	9.8	6.1	4.2	1.2	2.0
1969	15.1	6.1	1.5	5.9	7.2	6.1	4.7	-0.4	12.4
1970	17.1	3.6	2.2	0.5	8.2	6.4	5.2	4.8	22.6
1971	25.8	9.0	5.1	16.2	8.9	7.4	4.3	-0.1	8.9
1972	26.4	-0.9	-0.2	6.2	8.3	5.6	1.7	9.2	8.3
1973	21.3	1.0	26.4	2.3	8.3	6.9	4.6	-1.0	2.6
1974	8.8	3.5	11.0	7.2	6.0	6.3	6.1	6.4	6.6
1975	8.4	4.1	-13.5	6.1	3.2	5.1	1.7	-2.3	-1.9
1976	10.6	7.3	11.0	5.0	1.5	4.1	2.2	6.2	0.5
1977	12.0	5.3	21.8	4.9	1.5	4.9	-0.1	-4.6	-6.9
1978	14.3	7.3	18.3	9.7	-1.5	4.4	3.0	0.6	-2.7
1979	12.1	13.5	2.9	4.4	-1.8	4.4	3.8	-3.0	3.3
1980	12.0	7.4	-2.7	0.4	4.2	4.6	6.6	3.0	14.4
1981	9.1	3.9	0.7	-5.3	5.0	1.0	5.4	6.2	12.5
1982	12.2	6.4	4.5	2.5	-6.9	-0.4	-0.4	-2.8	2.6
1983	13.1	4.8	2.0	3.7	-15.7	-1.8	-1.8	-2.0	1.6
1984	8.5	4.1	5.5	5.4	-6.5	-0.2	5.1	-0.3	-1.9
1985	7.10	2.3	2.6	4.6	1.0	0.5	-1.2	1.6	6.9
1986	8.20	1.9	4.7	-0.2	-2.3	4.8	0.0	0.7	2.1
1987	11.9	1.6	0.7	1.6	14.7	3.6	2.1	2.7	1.2
1988	19.4	2.7	8.6	3.2	8.2	0.8	4.2	6.3	7.6
1989	13.1	-3.2	5.8	1.3	6.5	1.9	2.4	-1.0	5.2
1990	6.8	5.1	6.0	5.7	1.0	2.0	-0.3	-0.5	7.0
1991	7.5	-5.4	7.0	8.7	4.9	8.2	-1.0	0.0	5.5
1992	2.9	8.5	7.0	-7.3	-5.2	7.2	-2.1	-1.7	-9.0
1993	1.9	3.0	3.5	9.7	8.8	-1.6	1.2	6.8	1.1
1994	3.6	-5.3	6.0	-10.2	6.2	1.7	3.2	-8.6	9.2
1995	7.0	3.6	3.3	16.7	2.2	3.9	3.1	2.9	0.2
1996	5.8	-1.3	5.6	7.3	26.8	3.2	4.3	6.2	10.4
1997	8.0	4.0	3.7	3.8	10.8	4.2	2.6	3.8	2.7
1998	0.7	1.3	1.5	3.9	11.9	3.3	0.5	-0.4	2.9
1999	9.7	1.9	0.5	3.0	7.8	3.4	2.4	4.7	-0.8
2000	2.0	10.8	3.9	1.6	1.7	3.5	4.2	3.9	-3.1

2001	0.3	2.3	3.6	-5.0	12.7	1.2	2.7	5.3	1.4
2002	6.1	2.3	0.7	1.7	8.8	4.8	3.7	4.5	-8.9
2003	4.6	2.1	4.6	5.7	6.5	4.2	2.9	6.9	-17.0
2004	2.7	1.9	1.7	5.4	7.8	12.3	4.6	7.0	-5.8
2005	4.6	2.8	3.5	3.3	8.7	2.5	5.3	7.2	-5.7
2006	8.4	2.6	4.2	4.7	9.9	7.1	5.6	7.9	-3.5
2007	8.3	0.8	4.8	9.6	7.4	6.6	5.4	8.4	-3.7
2008	6.2	0.4	6.7	7.6	6.9	2.6	3.2	7.8	-17.7
2009	-7.7	1.9	2.2	8.3	6.4	0.3	-1.5	9.2	12.0
2010	8.6	2.2	6.1	6.9	6.7	6.0	3.0	10.3	12.6
2011	6.0	2.6	6.9	4.9	7.1	5.1	3.3	5.6	15.4
2012	4.5	3.0	6.0	1.9	7.2	5.1	2.2	7.6	14.8
2013	11.3	3.5	1.8	5.2	7.1	5.6	2.5	5.1	5.5
2014	4.1	2.1	3.1	5.7	7.4	6.4	1.7	4.7	2.1
2015	-1.7	1.0	2.5	2.8	6.6	6.0	1.3	2.9	1.7
2016	4.3	2.2	2.4	2.5	3.8	1.1	0.3	3.6	0.6